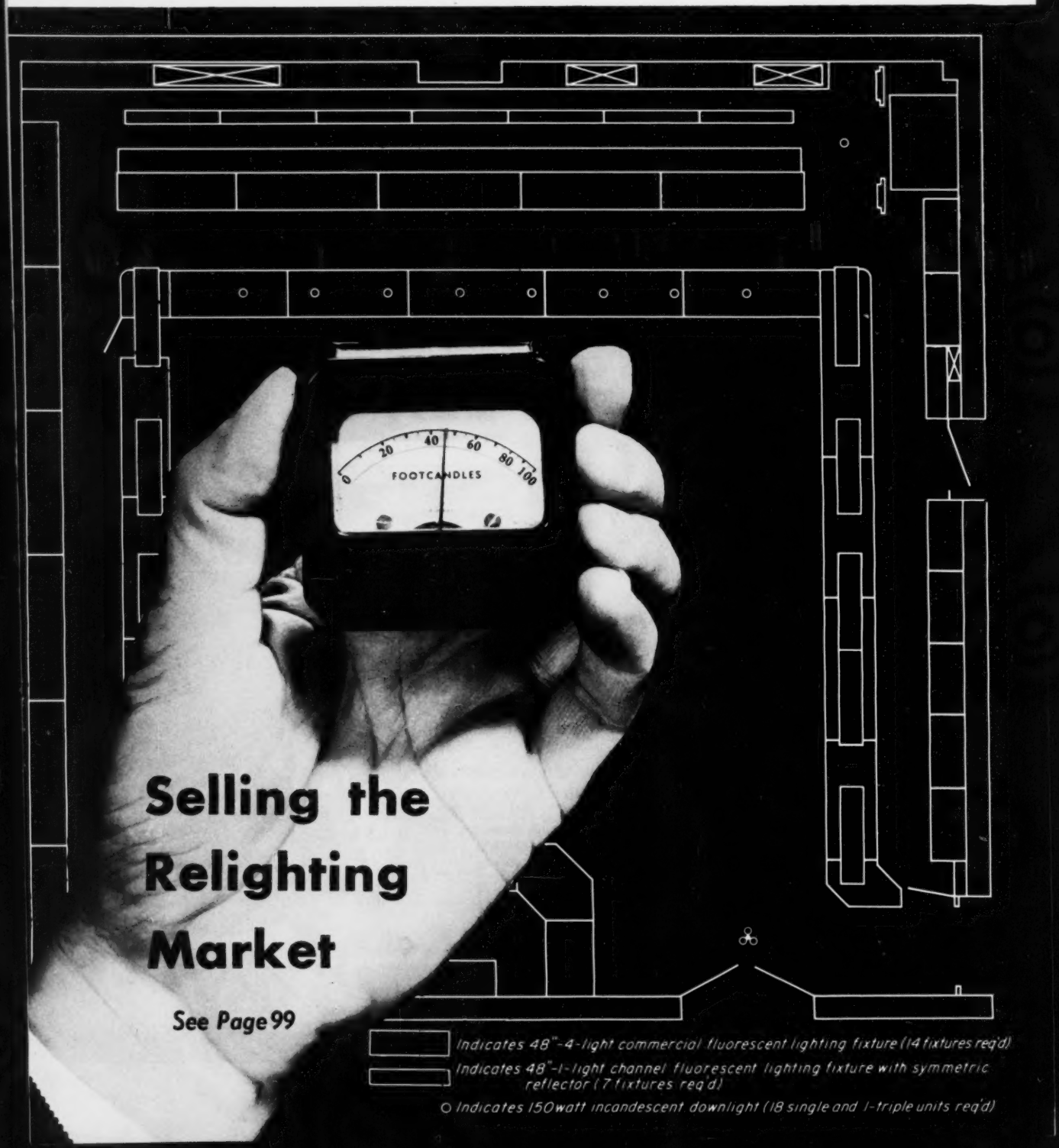
AUGUST 10, 1953

Electrical World

Price 35 Cents

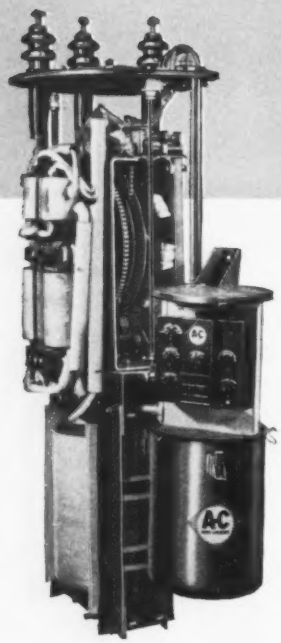
A McGRAW-HILL PUBLICATION



Selling the Relighting Market

See Page 99

KEY TO Low Operating Costs



Here's the thing that will keep your voltage regulator costs down for years and years of satisfactory operation: unit construction — a feature available only in Allis-Chalmers 5/8% step voltage regulators. Unit construction means thorough, high quality workmanship, practically trouble-free regulation. All connections can be made and inspected *before* the unit is tanked.

And it's unit construction that cuts inspection and service costs on your system. Untanking is fast and easy because transformer, mechanism, and control are all cover-suspended. Just remove the cover bolts and handhole cover; then the unit can be quickly untanked. And since there are no electrical connections to break, you can operate the regulator outside the tank merely by connecting a separate electrical source to the control.

And You Get It Only in

ALLIS-CHALMERS
5/8% STEP
VOLTAGE REGULATORS

A major advantage like unit construction is the natural result of Allis-Chalmers 20 years of 5/8% step regulator manufacturing experience. You get design and construction background like this only in an Allis-Chalmers voltage regulator.

In addition, you get field-proof of performance when you buy an Allis-Chalmers distribution regulator. They have proved their ability to deliver accurate, reliable service in nine years of field operation.

It will pay to get all the facts on Allis-Chalmers distribution regulators. Call the nearest A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4105

RATINGS AVAILABLE	7620 Volts—15, 50, 100 amp 5000 Volts—50, 100 amp 2500 Volts—100, 200 amp

ALLIS-CHALMERS

Originators of 5/8% Step Regulation

Off on a Pair of Tangents

For material for the annual mid-summer lighting feature, contained in this issue, the editors went off on sort of a tangent—maybe two tangents.

Finding a theme for the feature was easy. It was offered on a couple of platters. Organization of a NEMA bureau for the promotion of commercial and industrial relighting had been authorized and a stirring exhortation on the subject had been heard at the 1953 Edison Electric Institute general sales conference.

So relighting was the logical theme. Next came consideration of how to develop and present it. That's where the tangents come in.

The Great Compromise . . . Classic practice for an editorial feature is to make a survey. But had the idea of selling relighting, as distinct from selling lighting, been strongly enough and long enough emphasized that a survey would dredge up anything worthwhile?

Wouldn't it be better to collect and print an impressive number of pictures of relighting installations as evidence of what can be done along that line?

The decision was a compromise; "I'll take some of each, thank you." And so the feature combines a survey with a flock of pictures.

The second tangent was caused by the fact, and this is in confidence, that the editors did not know enough about organizations and methods for selling lighting to set up a competent questionnaire for the survey.

Luck in a Roaring Camp. . . Luckily, one of our peripatetic staff members had just brought in material for an article on the subject, and this was seized upon with gurgles of editorial delight. From it was built up a check list, the very easiest kind of survey form it is possible for anyone to devise.

Thus it is that you find from pages 99 to 122 a different kind of lighting feature and we hope you like it.

Electrical World

Published for 78 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

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ALUMINUM . . . including the *ELECTRICAL WIRE* and *CABLE*

Aluminum Company of America's new headquarters, towering above Pittsburgh's Golden Triangle is a miracle of architecture in aluminum.

This 30-floor, aluminum sheathed structure is a glittering new symbol not only of growing Pittsburgh, but of the increasing use of aluminum itself.

Aluminum was used for all wire and cable conductors, conduit, raceways, connectors, lugs, junction boxes, and other electrical equipment. The Okonite Company supplied a major portion of the aluminum cable.

This installation is typical of Okonite's versatility in the manufacture of insulated cables. Extensive experience for many years with aluminum conductors has provided us with the widest background in the most advantageous applications of insulated aluminum cables for aerial, underground, or conduit installation.

Two new Okonite booklets describe recent developments resulting from our research and engineering experience with aluminum conductors:

Bulletin EW-1062 discusses the installation and splicing techniques used on the first 15kv paper insulated aluminum conductor underground power cable.

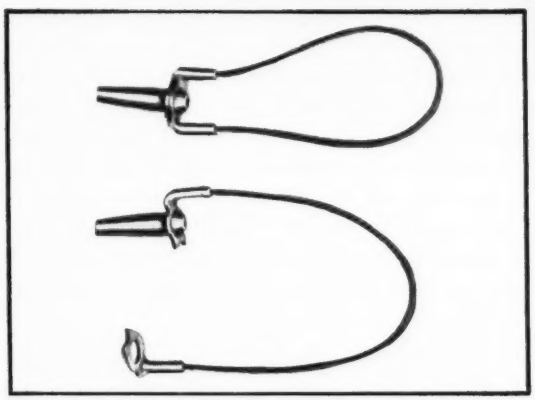
Bulletin EW-1063 gives new information on the electrical and physical properties of insulated aluminum conductors particularly for use with electrical equipment.

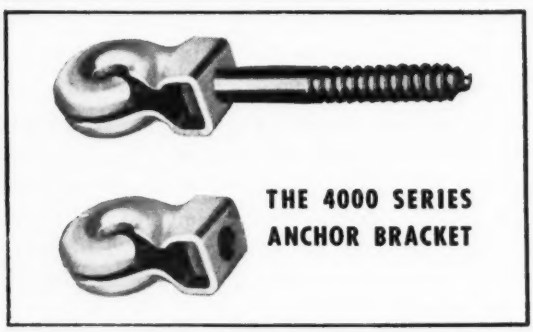
Your request for these booklets will receive our prompt attention. The Okonite Company, Passaic, N. J.

The best cable is your best policy

OKONITE OKONITE SINCE 1878 ***insulated wires and cables***

Electroline
AUTOMATIC DEAD-END
for Neutral Supported Multiple Conductor Service-Drop Cable





THE 4000 SERIES ANCHOR BRACKET

This Electroline Automatic Dead-End is designed for use with neutral-supported type of service drop. The insulation on the phase wires is not destroyed because these Dead-Ends grip only the bare neutral. This eliminates the possibility of shorting any phase. Available only for No. 6-AWG conductor. For automatic line Dead-Ends use the Electroline 3400 Series.

THE ELECTROLINE 3800 SERIES Automatic Dead-Ends lower construction costs because they are easily installed in a few seconds. This Dead-End is assembled as a one-piece unit with no loose parts to be dropped or lost. One end of the flexible bail is detachable for use with a spool-type insulator or other types of supporting anchorages now in service. This feature permits quick and easy installation with only one part, other than the conductor, to be handled by the lineman.

ELECTROLINE 4000 ANCHOR BRACKET — The 4000 Series Service Bracket, for use on permanently multi-grounded neutral systems (ideal for use with 3800 Series Dead-Ends as illustrated below), permits quick and simple insertion of a closed bail or loop—supports the cable at any angle. Installation costs are further reduced since this method of anchoring eliminates the insulator and insulator hardware.

WRITE FOR NEW BULLETINS FOR FULL INFORMATION

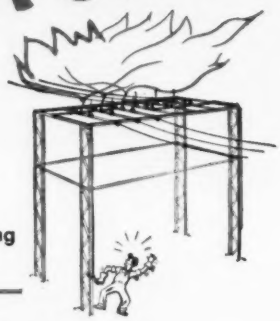
TALENT TO ORIGINATE · E · ABILITY TO PRODUCE

Electroline Company

4121 South La Salle Street • Chicago 9, Illinois

In Canada: **POWERLITE DEVICES, LTD., TORONTO**

Alduti INTERRUPTER SWITCHES



① Where Horn Gap Switches Are Inadequate

because horn gaps cannot, under all conditions, safely break magnetizing or charging currents; nor can they interrupt load currents

② Where Circuit Breakers Are Too Expensive

for non-automatic switching and short circuit protection

ALDUTI INTERRUPTER SWITCHES

offer a proved and economical solution to such application problems.

Ten years of operating experience in thousands of installations, and many field trials under severe test conditions, have demonstrated the ability of these Interrupter Switches to — safely and repeatedly —

- Sectionalize either radial or loop distribution and subtransmission circuits, under either load or charging current conditions . . .
- Switch load and magnetizing currents of transformer banks . . .
- Switch charging currents of capacitor banks.

And because there is NO EXTERNAL ARCING during the operation of Alduti Interrupter Switches: they need not be mounted horizontally upright, but can be mounted vertically, or underhung; hook stick operation can be employed where economy dictates; and phase spacings can be reduced to 18 inches for the 7,500-volt and 33 inches for the 34,500-volt switches. Hence structures can be smaller, connections simpler, and construction cost can be reduced below that of installing horn gap switches.

Also, Alduti Interrupter Switches can be metal-clad, thus providing—even for subtransmission applications — enclosed "packaged-type" switches, thereby permitting the complete enclosure of all components of a substation.

When combined with S&C Power Fuses, Alduti Fused Interrupters also provide short circuit protection with fault current interrupting ability up to 40,000 amperes asymmetrical, thus making possible the elimination of expensive circuit breakers where automatic switching is not required.

Alduti Interrupter Switches are supplied in these ratings:

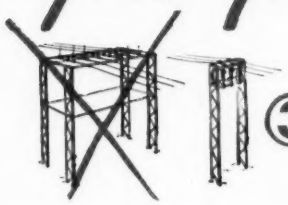
Volts	Continuous Amperes	Interrupting Amperes, Nominal
For hook stick or group operation		
7500 & 15000	400, 600, 1200	400, 600
For group operation only		
23000 & 34500	600	600

S&C ELECTRIC COMPANY

Formerly SCHWEITZER & CONRAD, INC.

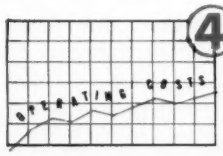
IN CANADA: S & C Electric Canada, Ltd.
8 Vansco Road, Toronto 14, Ont.

give you Great Advantages:



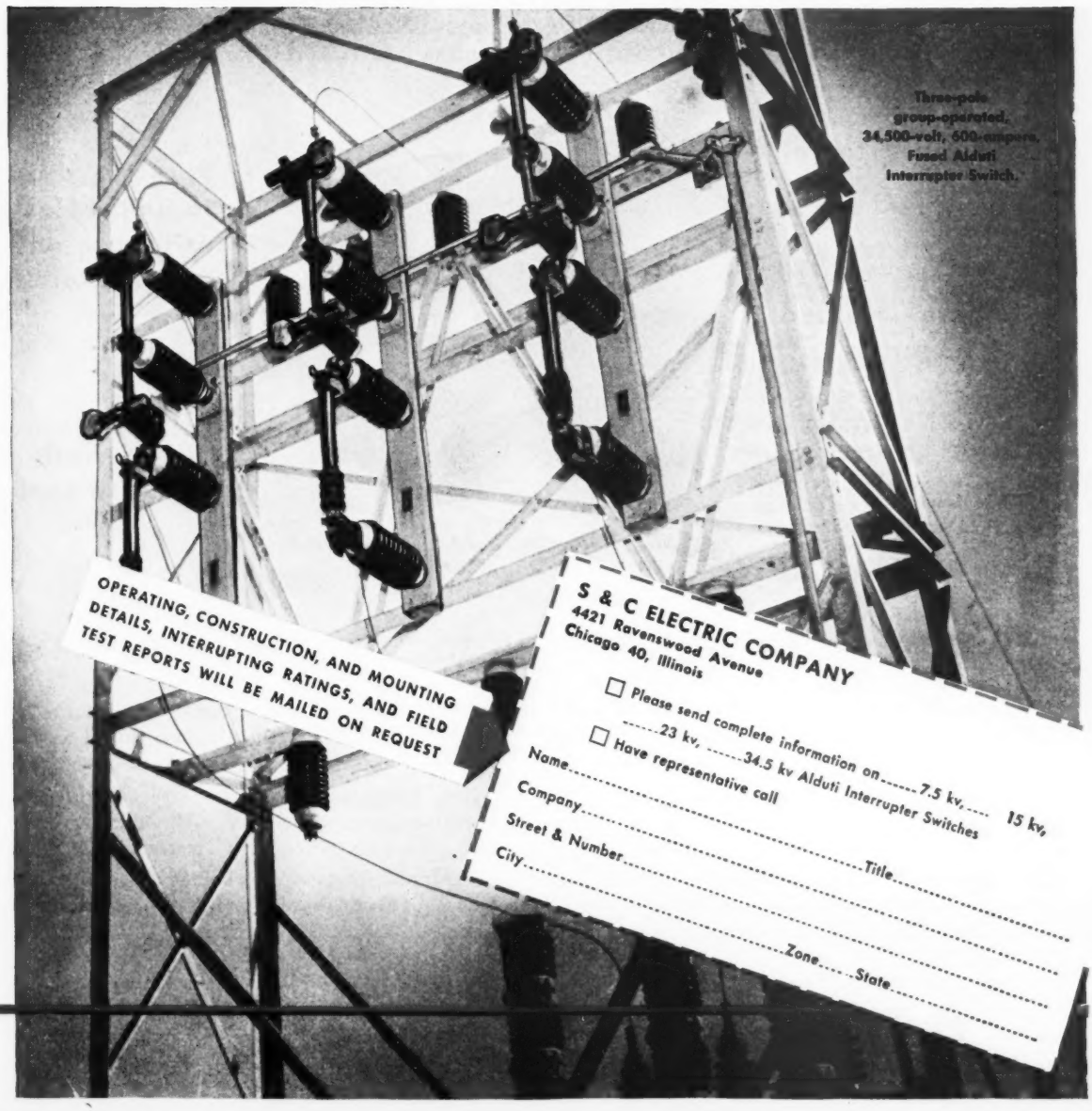
③ Where Structure Design Is Restricted

because horn gap switches can be mounted only in the horizontal upright position, and need wide phase spacings



④ Where Switching Sequences Are Complicated And Costly

because multiple operations—involving breakers, disconnects, and operating personnel— are required to isolate equipment or sectionalize circuits



Three-pole group-operated, 34,500-volt, 600-ampere, Fused Alduti Interrupter Switch.

OPERATING, CONSTRUCTION, AND MOUNTING DETAILS, INTERRUPTING RATINGS, AND FIELD TEST REPORTS WILL BE MAILED ON REQUEST

S & C ELECTRIC COMPANY
4421 Ravenswood Avenue
Chicago 40, Illinois

☐ Please send complete information on ..... 7.5 kv, ... 15 kv, ...23 kv, ...34.5 kv Alduti Interrupter Switches

☐ Have representative call

Name.....Title.....

Company.....

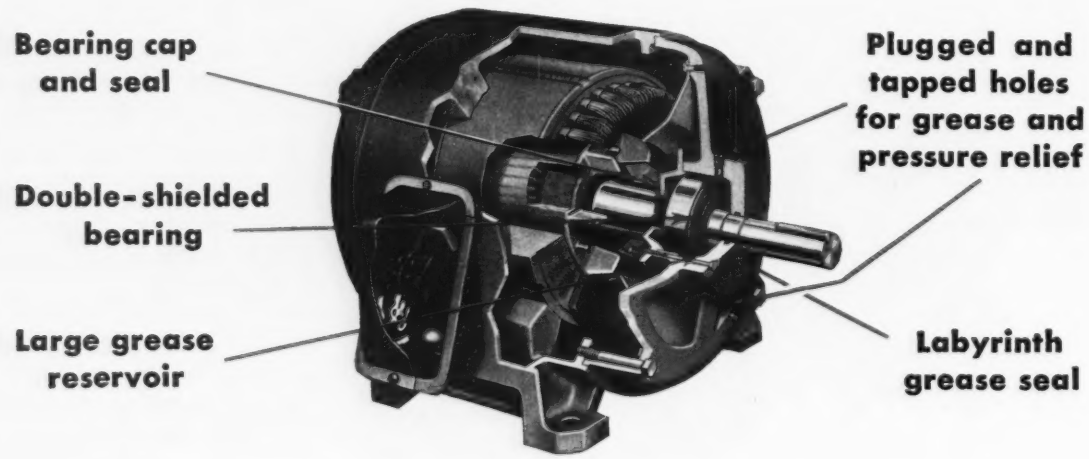
Street & Number.....

City.....Zone.....State.....

Here Are Facts You Should Know About Electric Motor Bearings

An ideal motor bearing would operate for indefinitely long periods under all types of conditions without requiring any attention whatever. However, in the opinion of our engineers, such a bearing and its attendant lubricant are not yet available on the commercial market. Consequently, bearings for many types of operations, particularly where overloading, extreme temperature ranges and chemical and dirt laden atmospheres are involved, require special lubricants or regular lubrication schedules.

Of course, bearings suitable for many kinds of operation under normal conditions can be built to require no attention for very long periods — usually several years. Allis-Chalmers can supply sealed bearings in all frame sizes through 505 on short delivery and without extra cost for applications of this type.


Bearing cap and seal
Double-shielded bearing
Large grease reservoir
Plugged and tapped holes for grease and pressure relief
Labyrinth grease seal

Which is the Best Design for *Your* Application?

We believe that the design used in standard Allis-Chalmers drip-proof, tefc and explosion-proof motors represents the best design for most industrial users.

The Allis-Chalmers standard design consists of a prelubricated, double-shielded bearing mounted in the end housing with a generous grease reservoir. Plugged and tapped holes are provided for grease and for pressure relief. Under normal operating conditions, this design will operate as long without attention as any other type of bearing in use today. But where difficult operating conditions make relubrication desirable, it can be done as part of the normal lubricating-routine without dismantling the motor.

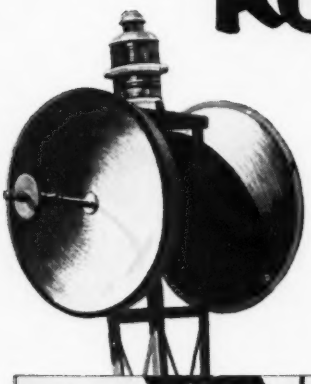
The large grease reservoir and shielded bearing design assure that grease lost from the bearing due to high operating temperatures or other causes will be replaced automatically.

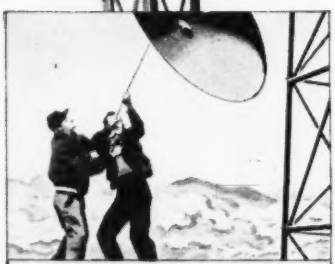
For further information on bearing design and other features of Allis-Chalmers motors, call your nearby Allis-Chalmers District Office or Authorized Distributor. A-4130

ALLIS-CHALMERS

RCA MICROWAVE

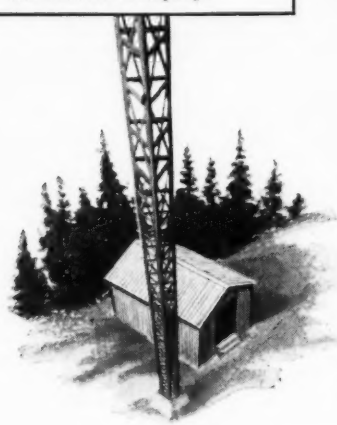
RADIO-RELAY COMMUNICATION AND CONTROL





SPECIFY RCA 2-WAY RADIO for dependability in mobile communications.

AND REMEMBER, only RCA can provide the nation-wide service facilities of the RCA Service Company.



Complete installation service from survey to operation

For thoroughly dependable, 100%-controlled installation, RCA offers you the important benefits of its sound over-all planning and complete facilities.

For route planning, RCA provides the services of an expert aerial survey team—at a cost justified many times by its speed and accuracy. To help you over the rough spots in system planning, RCA offers the assistance of experienced Microwave field specialists. For successful installation, RCA will arrange and supervise all phases of construction, and will place your system in operation.

All, or any part of, the complete RCA Communications organization is available to you when you specify RCA Microwave.

For successful communication, call an RCA Communications representative located at your nearest RCA Regional Office, or *mail coupon below.*

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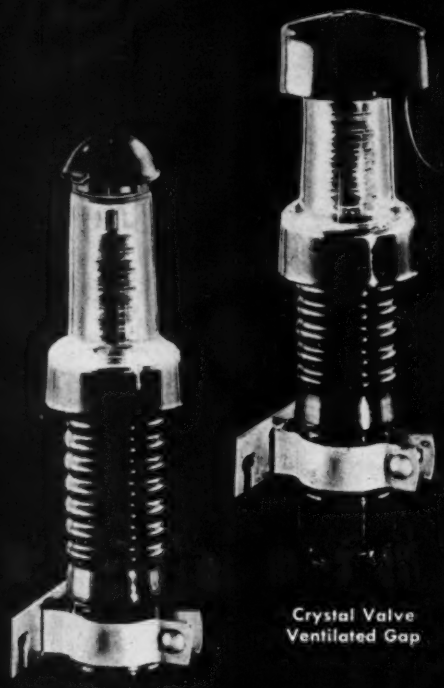
PERFORMANCE-PROVED For Your

Crystal Valve
Porcelain Body Types



Crystal Valve
Ventilated Gap

Crystal Valve
Ventilated Gap

Crystal Valve
Glass Body Type

ELECTRIC SERVICE MANUFACTURING CO.

POWER PROTECTION

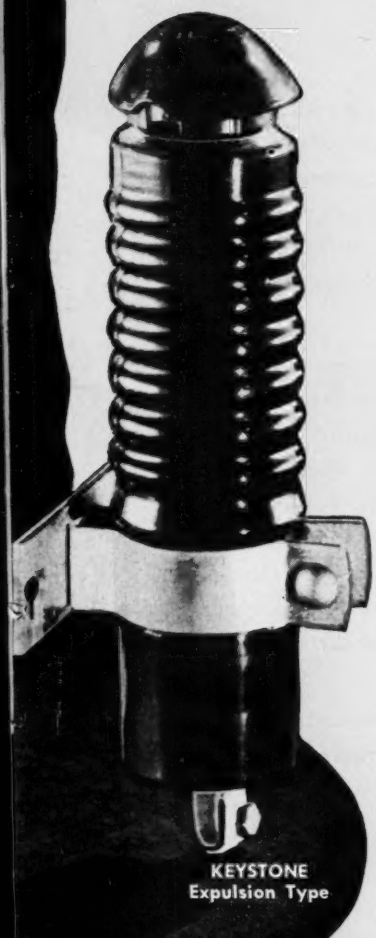
CRYSTAL VALVE

THE MULTI-PURPOSE ARRESTER

Millions of Crystal Valve Arresters, on all types of installations and under every kind of adverse lightning condition, have achieved an unsurpassed performance record all over the world.

Accurately spaced high-speed multiple spark gap elements, with smooth, flat arcing surfaces, insure low impulse spark-over. Oxidized silicon carbide valve element guarantees fast surge voltage reduction, low IR voltage and quick suppression of follow current. Non-deteriorating . . . no radio interference . . . moisture-proof.

Crystal Valve Ventilated Spark Gap Arresters have scored better than 99% perfect in operational rating over the past 16 years. Glass body for gap housing makes inspection easy. Vents permit free air circulation, prevent corrosion.



KEYSTONE EXPULSION TYPE

IDEAL FOR RURAL LINES

The parallel discharge paths found only in the Keystone Expulsion Type Arrester make it particularly suited to rural circuits. Low impulse spark-over voltage means maximum safety to transformer insulation. Extinguishment of follow current flow is so rapid that line voltage disturbance rarely occurs.

Rugged construction assures long, trouble-free life. Ventilated body guarantees dryness at all times.

Write today for latest technical data on Crystal Valve or Keystone Expulsion Arresters. No obligation.

Philadelphia 32, Pa.

Represented in Canada by Lyman Tube and Bearing, Ltd., Montreal and Toronto

3-D IN TRANSFOR

Moloney Electric has always kept pace with the changing needs of the utilities . . . and the company's current expansion program will add a new dimension to production facilities to round out today's power picture. Power transformers of any Kva and voltage rating will be built and tested in a new building especially designed and equipped for this purpose.

This is vision with the utility perspective . . . for as utility engineers design larger systems to meet increasing demands efficiently and economically, they will specify power transformers of larger capacity. Moloney is prepared to provide power transformers in any rating the industry may desire. From design . . . to fabrication . . . to delivery . . . the Moloney team of engineers and craftsmen will put into these power transformers the same "extra quality" that has been the mark of Moloney for over fifty years.

When you plan your system, select power transformers that offer you added efficiency and economy. Consider everything . . . and you'll specify Moloney.

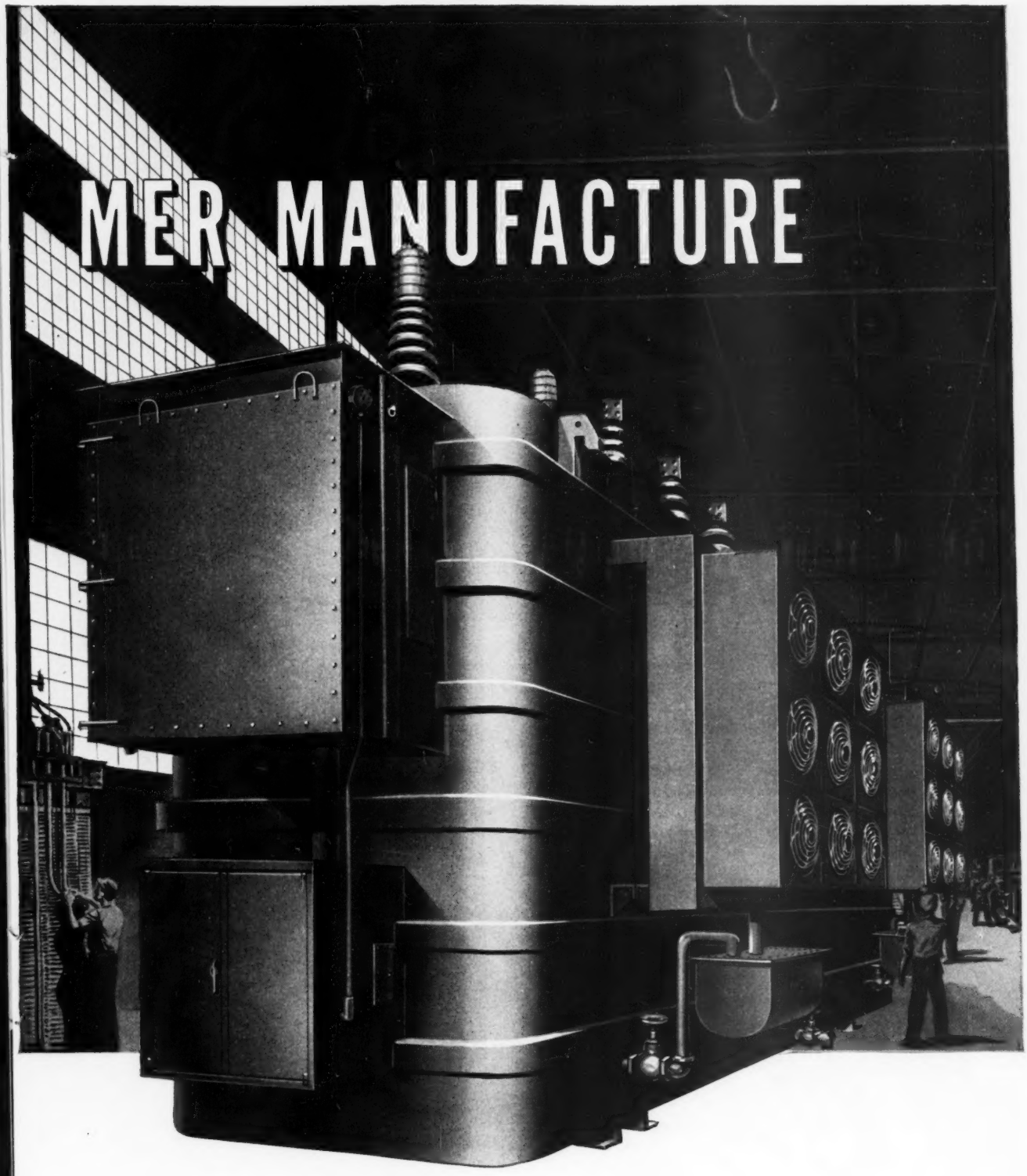
ME53-23

MOLONEY = { BETTER PERFORMANCE / GREATER RELIABILITY / LESS MAINTENANCE

M O L O N E Y

Manufacturers of Power Transformers

FACTORIES AT ST. LOUIS 20, MISSOURI



E L E C T R I C C O M P A N Y

Distribution Transformers • Load Ratio Control Transformers • Step Voltage Regulators • Unit Substations

AND TORONTO, ONT., CANADA • SALES OFFICES IN ALL PRINCIPAL CITIES

here's a

GOOD SIGN

that

Cope

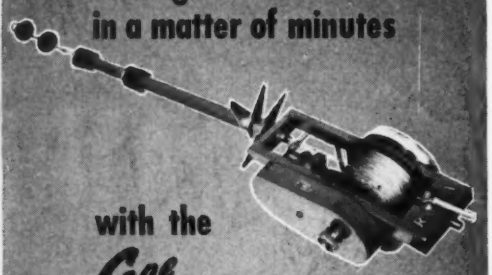
CABLE
INSTALLATION EQUIPMENT
IS ON THE JOB

For 65 years Cope equipment has been used most everywhere that cable is being installed. The rugged construction of the many items comprising the Cope line, plus the ease of handling and using them, has created a wide preference for them.

Recently added to the line is the Type-B Warning Sign shown here. It features exceptional wind resistance which results from the panel being balanced to hang vertically and allowed to swing. This sign really *stays in position* for constant worker safety.

The yellow panel, 18 inches square with five inch high black letters, has high visibility. A flag holder is provided and the entire unit folds flat for transportation. Ask for our new Catalog 65 showing the complete Cope line.

Now you can fish underground conduits in a matter of minutes



with the Cope

PNEUMATIC FISHLINE

Here is a real time and money saver. For years, used for underground conduit fishing with outstanding success, it now features numerous design improvements. It is in fact a compact, portable air-gun that shoots a Neoprene projectile through a conduit to a "target" manhole and when reversed it draws back a lead wire or cleaning tools as necessary.

Just one man can position the Cope

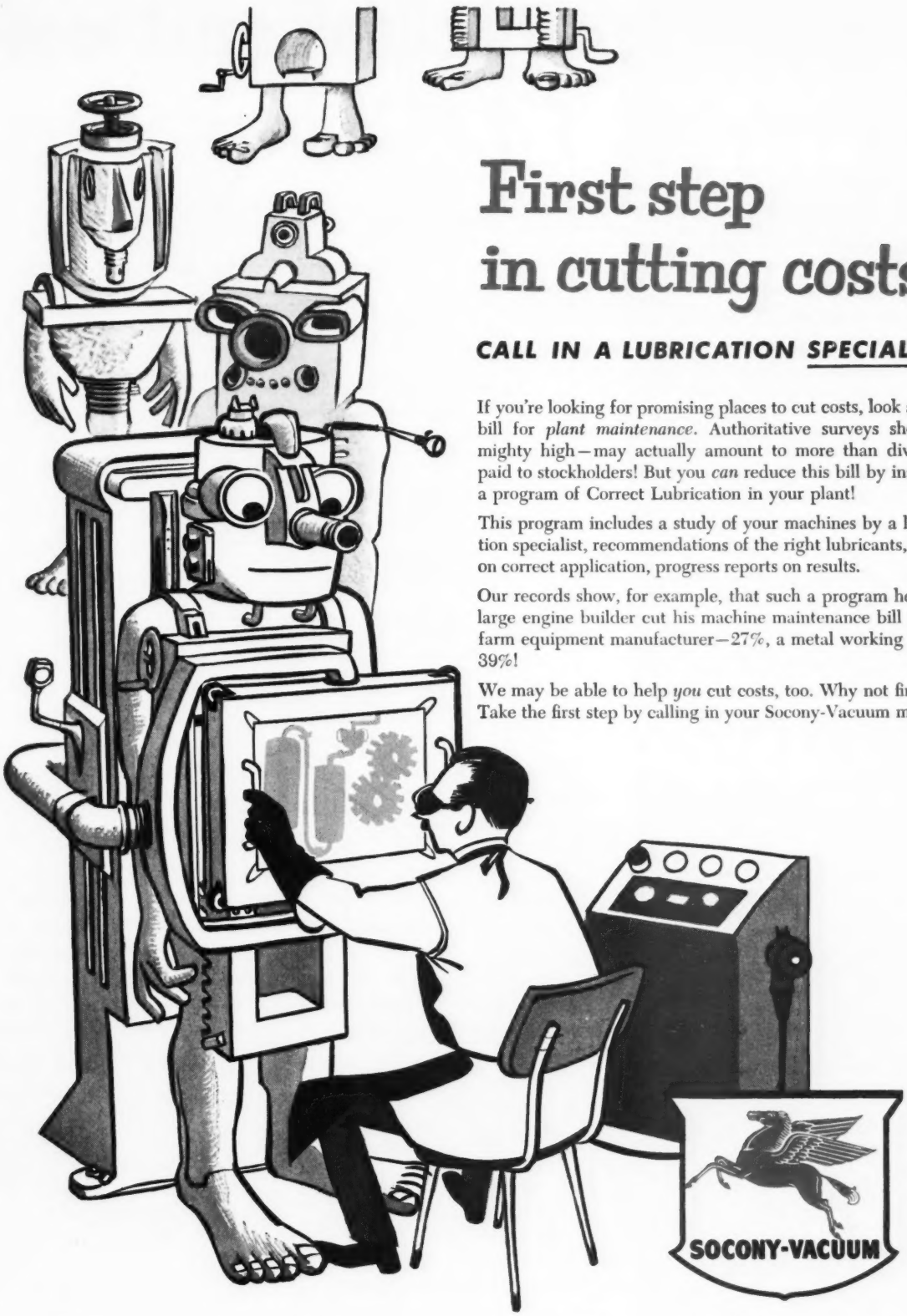
STRINGING SHEAVE

This two part unit with a complete weight of only 29 pounds greatly simplifies handling and positioning. The special vise type chain is much easier to wrap around pole while its stronger grip prevents slipping from set position. Lifting of cable to place in messenger hanger is unnecessary. Self-aligning mounting prevents creeping up the saddle with possible damage to cable lashings. Use it for cable up to 4 inch diameter.

T.J. Cope INC.

711 South 50th St., Philadelphia 43, Pa.

OTHER COPE
CABLE INSTALLATION EQUIPMENT
preferred for 65 years



First step in cutting costs...

CALL IN A LUBRICATION SPECIALIST!

If you're looking for promising places to cut costs, look at your bill for *plant maintenance*. Authoritative surveys show it's mighty high—may actually amount to more than dividends paid to stockholders! But you *can* reduce this bill by installing a program of Correct Lubrication in your plant!

This program includes a study of your machines by a lubrication specialist, recommendations of the right lubricants, advice on correct application, progress reports on results.

Our records show, for example, that such a program helped a large engine builder cut his machine maintenance bill 24%, a farm equipment manufacturer—27%, a metal working plant—39%!

We may be able to help *you* cut costs, too. Why not find out? Take the first step by calling in your Socony-Vacuum man!

Socony-Vacuum *Correct Lubrication*

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

TYPICAL

RILEY

1,250,000 lbs. hr.

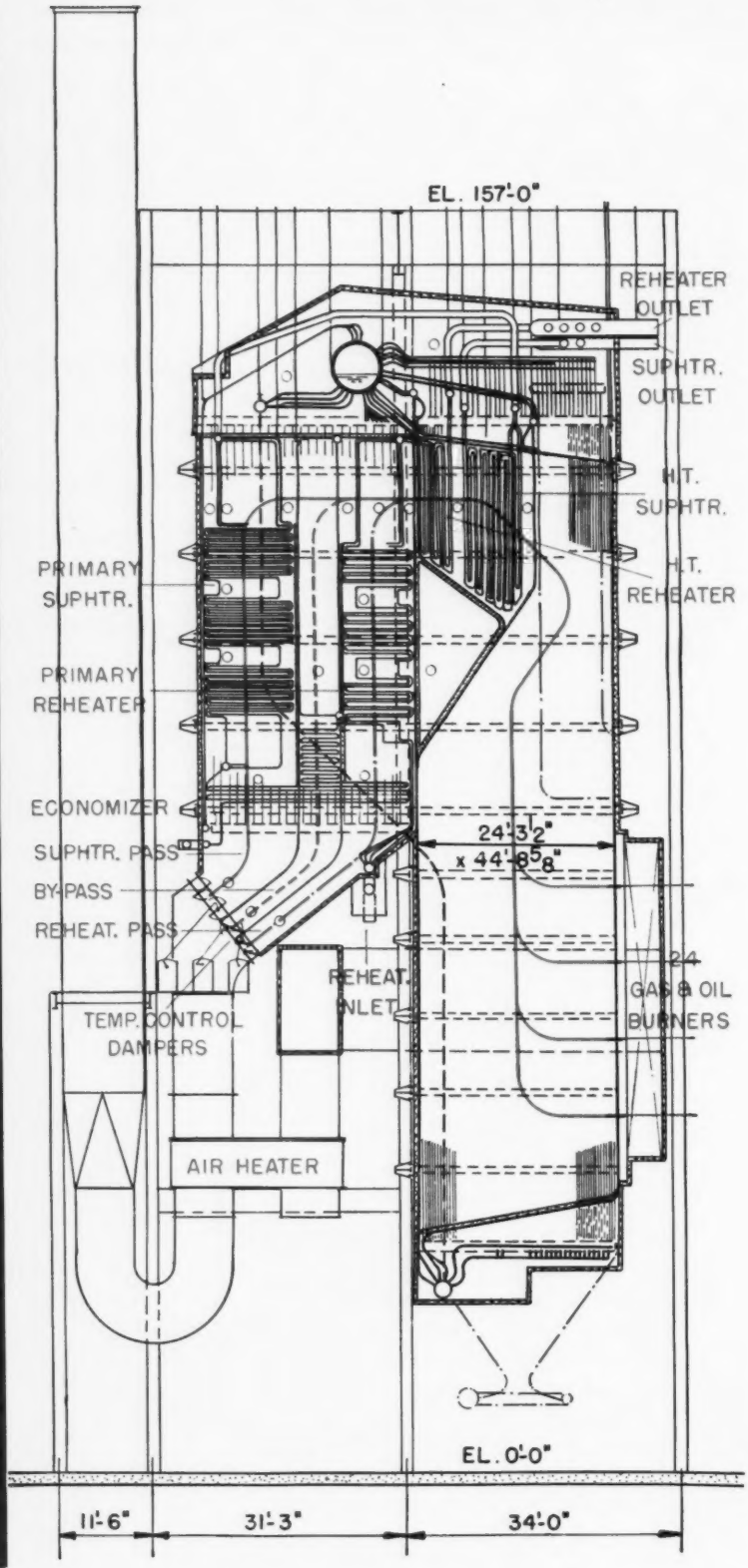
REHEAT UNIT

Capacity—1,250,000 lbs. hr.
Design Pressure—2125 psig.
Superheater Outlet Pressure—1925 psig.
Steam Temperature—1005°F.
Reheater Capacity—1,148,000 lbs./hr.
Reheater Outlet Pressure—470 psig.
Reheater Temperature—1005°F.
Efficiency Gas Firing—83.7%
Pressurized Furnace
Fired by Gas. Oil Standby
Designed for future conversion to Lignite firing.

AUTOMATIC STEAM & REHEAT TEMPERATURE CONTROL

This typical Riley Reheat installation utilizes gas by-pass dampers located in a low-temperature area beneath the Economizer to automatically proportion the gas flows over the Superheater and Reheater primary surfaces. Steam temperatures and reheater temperatures are maintained constant at 1005° Fahrenheit over a wide load range. At high loads, if required to maintain desired temperatures, part of the gases can be by-passed through the open lane between Reheater and Superheater primary surfaces. Note extra Economizer surfaces in the By-Pass line. This arrangement provides for approximate uniform exit gases.

You, too, can rely on Riley experience and know-how when considering steam generation and fuel burning equipment.



These large Public Utility Companies have ordered RILEY Reheat Units

with steam capacities as high as **1,250,000** *pounds per hour!*

- **HOUSTON LIGHTING & POWER CO.**
  1,250,000 lbs./hr.
  2075 psig. 1005°F.
  1005° Reheat
- **DALLAS POWER & LIGHT CO.**
  1,250,000 lbs./hr.
  2075 psig. 1005°F.
  1005° Reheat
- **TEXAS ELECTRIC SERVICE CO.**
  1,250,000 lbs./hr.
  2075 psig. 1005°F.
  1005° Reheat
- **PUBLIC SERVICES OF INDIANA**
  884,000 lbs./hr.
  2050 psig. 1005°F.
  1005° Reheat
- **DEPT. OF WATER & POWER**
  City of Los Angeles, Cal.
  1,200,000 lbs./hr.
  2075 psig. 1000°F.
  1000° Reheat
- **LOUISIANA POWER & LIGHT CO.**
  1,000,000 lbs./hr.
  1725 psig. 1005°F.
  1005° Reheat
- **UTAH POWER & LIGHT CO.**
  575,000 lbs./hr.
  1700 psig. 1000°F.
  1000° Reheat

These are but a few of the big Riley installations that are being ordered by power companies in State after State across the country. The Houston Lighting & Power Company, one of the large Southwest public utilities, has recently ordered two of the big 1,250,000 pounds per hour Riley Reheat Units. These will be their tenth and eleventh Riley units, nine others having been installed during the past fifteen years. These Riley units will increase the Houston Company's steam capacity to over 7,000,000 pounds per hour Both the Texas Electric Service Company and the Dallas Power & Light Company will also increase their power generating facilities with similar units of 1,250,000 pounds per hour capacity . . . conclusive evidence that Riley enjoys the confidence of increasing numbers of big, expansion-minded power companies.

TRADE MARK Rx REGISTERED

RILEY
STOKER CORPORATION

WORCESTER, MASS.
Boston, New York, Philadelphia, Buffalo, Washington, Pittsburgh, Cleveland, Detroit, Chicago, Cincinnati, Charlotte, New Orleans, Atlanta, St. Louis, Kansas City, St. Paul, Tulsa, Houston, Denver, Salt Lake City, Los Angeles, Portland, Seattle

COMPLETE STEAM GENERATING UNITS

BOILERS • PULVERIZERS • BURNERS • STOKERS • SUPERHEATERS • ECONOMIZERS
WATER-COOLED FURNACES • STEEL-CLAD INSULATED SETTINGS • AIR HEATERS

4 Powerful Reasons Why CHEVROLET ADVANCE-DESIGN TRUCKS will save money on *your* job . . .

EXTRA THRIFTY POWER! The improved Loadmaster engine in heavy-duty models has new high-compression ratio (7.1 to 1) to squeeze more power . . . more work out of every drop of fuel. In light- and medium-duty models, Chevrolet's advanced Thriftmaster engine delivers top-notch operating economy. Both give you the extra-long life and day-in, day-out dependability for which Chevrolet valve-in-head truck engines are famous.

ENGINEERED FOR THE JOB! Whatever you haul . . . wherever you haul it, your Chevrolet truck will be factory-matched to fit your requirements. That means you get the *right* power and the *right* chassis units throughout—tires, axles, springs and clutch—to suit your roads and loads. It means a truck that will do your job more easily . . . more efficiently.

MORE RUGGEDLY BUILT! New Chevrolet trucks are stronger and sturdier than ever before. Frames, for example, are heavier and more rigid. This extra, built-in stamina means miles added to truck life and dollars *subtracted* from upkeep costs! Another important "plus" you get with Chevrolet trucks!

AND THEY LIST FOR LESS! No other truck offers all of Chevrolet's advance-design features . . . all of Chevrolet's money-saving advantages. Yet Chevrolet is the lowest priced truck line of all! See your Chevrolet Dealer. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH** — for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTIPANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

CHEVROLET
first in demand
in value
in sales

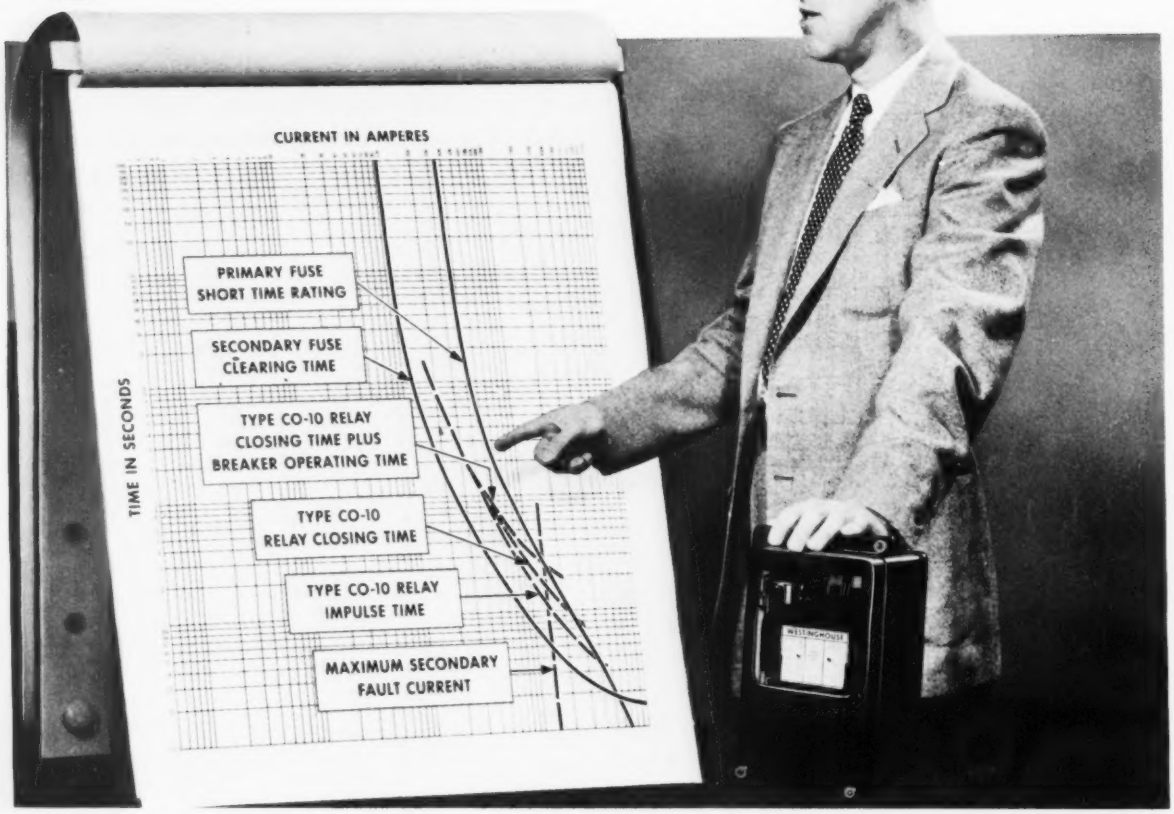
Meet C. L. Wagner,

Westinghouse Electric Utility Engineer. On the following pages he leads some discussions on . . .

Practical service continuity throughout your distribution system

Chuck Wagner acts as liaison between headquarters engineering groups and our district engineers. He handles all kinds of utility problems. Here, Chuck shows how Westinghouse equipment helps you achieve a higher degree of service continuity on your distribution system at a practical economic level.

"Here is relay engineer J. L. Blackburn discussing a problem that is basic to service continuity on distribution systems."


CURRENT IN AMPERES
TIME IN SECONDS
PRIMARY FUSE SHORT TIME RATING
SECONDARY FUSE CLEARING TIME
TYPE CO-10 RELAY CLOSING TIME PLUS BREAKER OPERATING TIME
TYPE CO-10 RELAY CLOSING TIME
TYPE CO-10 RELAY IMPULSE TIME
MAXIMUM SECONDARY FAULT CURRENT

This overcurrent relay gives you perfect coordination with fuses

The Westinghouse CO-10 relay can solve the problem of coordinating overcurrent relays with fuses on distribution systems for better service continuity. This relay coordinates better with fuses because of its extremely inverse time-current characteristics.

In a nutshell, this means that the relay will not trip open the breakers on overloads, but *will* operate quickly when currents of fault magnitude exist. The relay operating time decreases as the magnitude of the fault increases. Fuses have these same characteristics, and when used with the CO-10 relay, the degree of coordination that can be achieved makes possible a high level of service continuity.

Current settings are changed in the CO-10 relay by the well-known single-tapped coil system. Chief advantage of this system is that it keeps the flux density constant at corresponding multiples of minimum trip current for all tap settings. Thus the time-current curve is the same, regardless of the tap used.

Time-current curves are available for Westinghouse overcurrent relays with inverse, very inverse and extremely inverse characteristics. These curves are on transparent log paper so you can place the relay curve over your own fuse curve sheet and select the characteristic you desire. For curves or for additional information on the CO-10 relay, write to Westinghouse. J-40452

YOU CAN BE **SURE**...IF IT'S

"Rusty Campbell, Distribution Apparatus Product Engineer, discusses an important development . . ."

New sectionalizer has highest rating available today

We are now building GRS sectionalizers with a rating of 140 amperes which take their place beside other Westinghouse sectionalizers rated from 5 to 100 amperes. It is now possible to mechanically sectionalize important taps or portions of the main feeder where the continuous load current does not exceed 140 amperes.

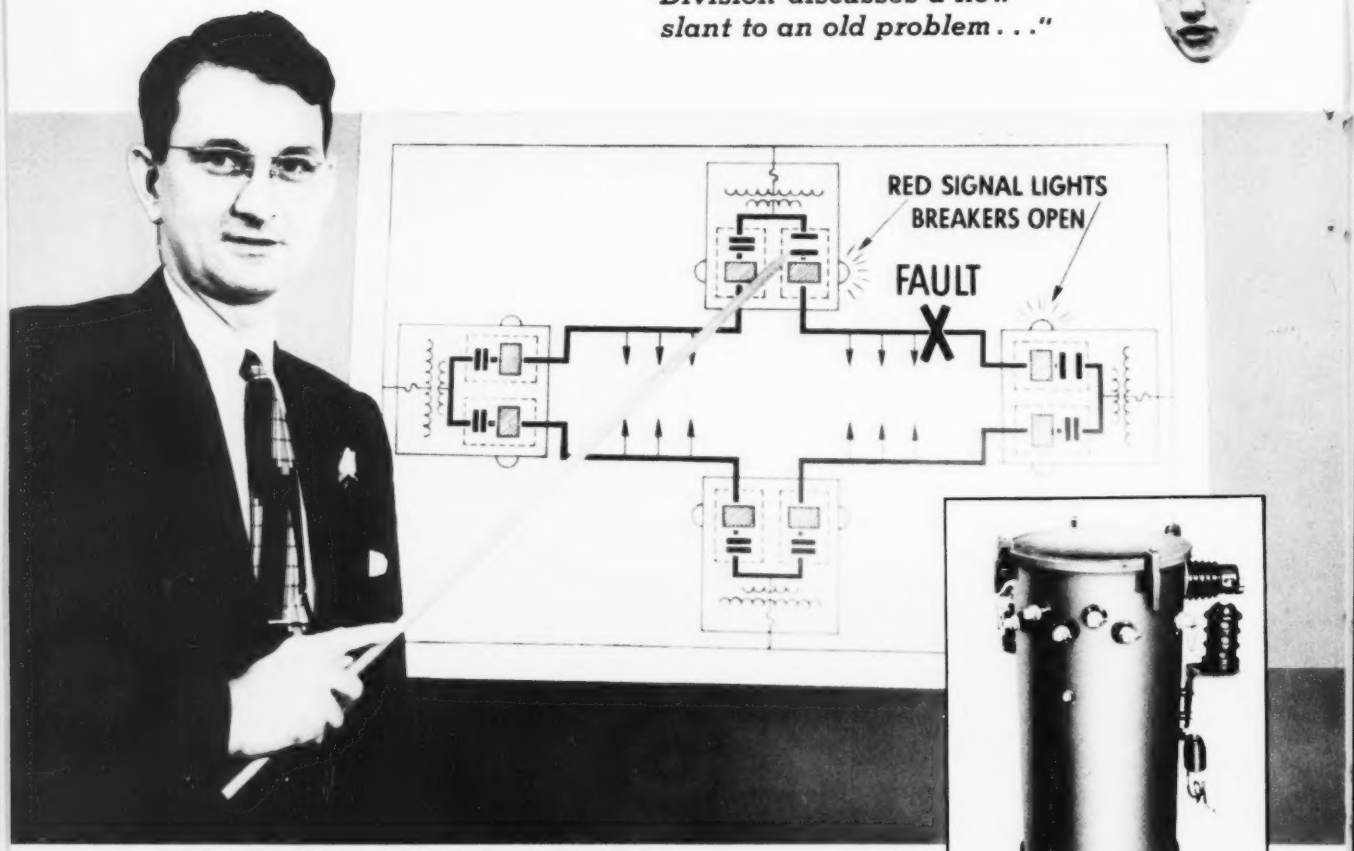
More and more utilities are applying these high-rated sectionalizers to solve service continuity and protection problems on their 2400 to 12,500-volt distribution lines. These sectionalizers are applied with reclosing station breakers and large reclosers and have these important advantages over fuses:

1. It is easy to coordinate sectionalizers and reclosing breakers because the sectionalizer has no time-current curve. (On temporary faults, it is practically impossible for the breaker to protect fuses on branches off the main feeder near the substation.)
2. Sectionalizers save money as there are no fuse links to replace. This also eliminates loss of coordination due to improper fuse replacement. Service is rapidly restored after a permanent fault by reclosing the sectionalizer with a hookstick or switchstick.
3. The sectionalizer has a load-break rating of 220 amperes and is, therefore, ideal for manually disconnecting or sectionalizing lines.

Westinghouse sectionalizers have the highest momentary rating available: 6500 asymmetrical amperes. The insulation is full 15 kv. Construction is rugged. The fault counter is magnetically compensated to eliminate temperature effect. Write for D.B. 38-760 for more information on this equipment. J-60844

Westinghouse

"Bob Ray of the Transformer Division discusses a new slant to an old problem . . ."*



"CSPB®" transformers make secondary banking practical for small towns, too

The inherent design of "CSPB" transformers gives small towns of eight to ten thousand population all the advantages of banked secondaries—without the disadvantages of fuse coordination—cascading blackouts and extensive system maintenance.

In a "CSPB" banked secondary system, a fault occurring anywhere on the secondary of the system is isolated. This is possible because each transformer contains two internal circuit breakers connected to the low-voltage circuit, one to serve each direction in which the secondaries extend. Red signal lights warn of overloads or indicate faulted sections. The breakers automatically isolate the area when a section is faulted or dangerously overloaded.

The entire transformer capacity is thus available to supply the remaining load. Due to diversity, less transformer capacity is needed—no problem of fuse coordination or cascading exists.

Internal protective links protect the system against line "lockout" by isolating a damaged transformer from the system. Complete lightning protection to high and low-voltage transformer windings is furnished by De-ion® arresters and coordinated low-voltage bushings, arranged for 3-point surge protection.

In addition, substantial savings are realized with an "engineered package" installation instead of the three or four hookups common to conventional installations. For more data, call your Westinghouse representative, or write for Booklet B-4310-A.

J-70702

*Manager, Distribution Transformer Sales

YOU CAN BE **SURE**...IF IT'S

"Here's Paul Sprowl, Manager of Step Regulator Engineering, to discuss a current regulator problem."

Field tests prove 16-step regulator gives optimum cost and continuity balance

Westinghouse engineers are well aware of your definite need in maintaining an optimum balance between the cost and continuity factors of feeder voltage regulation.

They knew from the start that 16-step design for pole-type regulators would provide the best regulation with minimum maintenance on a theoretical basis. Actual field test data, however, was needed before the theory could be verified and executed.

Three utilities cooperated and the Westinghouse URL-16 step regulator was tested against competitive designs. The results establish beyond any doubt, that the 16-step regulator fulfills industry requirements—with fewer operations—with better mechanical construction and electrical clearances and with excellent contact life and minimum maintenance.

Your Westinghouse representative now has a full report on these tests. He will be glad to show you actual figures proving the URL-16, pole-mounted regulator to be the optimum balance between your service continuity and cost requirements for feeder voltage regulation. Call him in for a practical discussion of economical service continuity. Or write now for Booklet B-5841, which describes many important features of the URL-16. J-10407

Westinghouse

"Al Larson describes a major cutout development which can help you maintain service continuity and obtain . . ."*

Real savings with the most flexible enclosed cutout

Why change the entire cutout when fault or load current increases, exceeding the rating of your present standard cutout? With the new, more flexible Westinghouse design all you do to meet these requirements is use one of the interchangeable doors.

This is the standard Westinghouse Prestite® porcelain, enclosed fuse cutout box. It is used for all three of the commonly used cutouts shown. Its sturdy construction and generous contacts make possible the exclusive door interchangeability feature.

Just think what this flexibility means to you—*one* housing, *three* cutouts.

FIRST: You can buy the standard EA, 50-ampere cutout, where fault and load currents permit. This means the lowest investment to start with.

NEXT: If *fault* currents increase beyond the 1200-ampere rating of the EA, an HC (high capacity) door can be added to the already installed box. The HC has an interrupting capacity of 5000 amperes at 5.2 kv and 8000 amperes at 2.5 kv.

THEN: Should *load* currents exceed 50 amperes, you can install the MC door in the *same box* which gives you a 100-ampere cutout having the same interrupting capacity as the HC (above).

No other cutout manufactured today provides this degree of flexibility. To change cutout ratings from standard to higher load current and interrupting capacity, you change only the door: from EA-50 to HC-50 or MC-100. All doors are available in dropout or non-dropout styles. The same flexibility is available at 7.8 kv.

Write now for more detailed information on the most economical cutout line available.

J-60845

*A. W. Larson is Manager,
Switchgear Distribution Apparatus Department

YOU CAN BE **SURE**...IF IT'S

"Distribution Apparatus Product Engineer, Bob Lawrence, discusses a simple way to cut down service outages . . ."

Exclusive dropout feature prevents line lockout

Damaged arresters are rare. But a lot of trouble can be caused if an arrester locks out a line as a result of a nearby heavy, direct stroke or abnormal 60-cycle voltage through misapplication. Westinghouse LV arresters contain an exclusive dropout feature which prevents line lockout. A reduced section of porcelain at the bottom cracks, allowing the ground lead to drop out if the arrester is ever damaged. The broken ground connection is easy to spot, identifying the damaged arrester.

Westinghouse Autovalve® arresters are the only *distribution* arresters which are designed, tested and work on the same principles as large station and line-type arresters.

Each completed Autovalve element must pass two severe electrical tests:

1. Two hot lightning surge tests. A long-tailed (12 x 45 microsecond), 5000-ampere surge is applied while 60-cycle voltage is present (3000 volts).
2. Impulse characteristic test. A cathode ray tube records the volt-ampere characteristic when passing a 10 x 20 1500-ampere current surge. Blocks whose characteristics do not fall within narrow limits are rejected.

A durability test is applied to each batch of Autovalve blocks. A 5% sample receives 30 surges at 5000 amperes. Each completed LV arrester must also pass a pressure test and a 60-cycle sparkover test.

These exclusive tests and the dropout feature found only in Westinghouse distribution arresters have provided a spotless, 13-year field record.

Write today for D.B. 38-140 for detailed information on Westinghouse LV arresters. J-60843

Westinghouse

We're building the world's newest meter plant at Raleigh

Good service continuity makes more customers. To help you measure your growing loads, Westinghouse is now building this new meter plant at Raleigh, N. C. The smaller picture shows how it will look when complete next year.

We're really proud of this new plant. Its one-half-million square feet of manufacturing space will contain modern machinery and the latest in production and control techniques—devoted wholly to meter manufacture and development to meet your ever-expanding needs.

The new Raleigh plant will occupy 100 acres, conveniently located one mile north of Raleigh on U. S. Route 1. Two major railroads and three major airlines serve Raleigh and will help insure our aim of fast service to you.

If you're in the neighborhood of Raleigh next year, we hope that you will visit our "New Home of Metering".

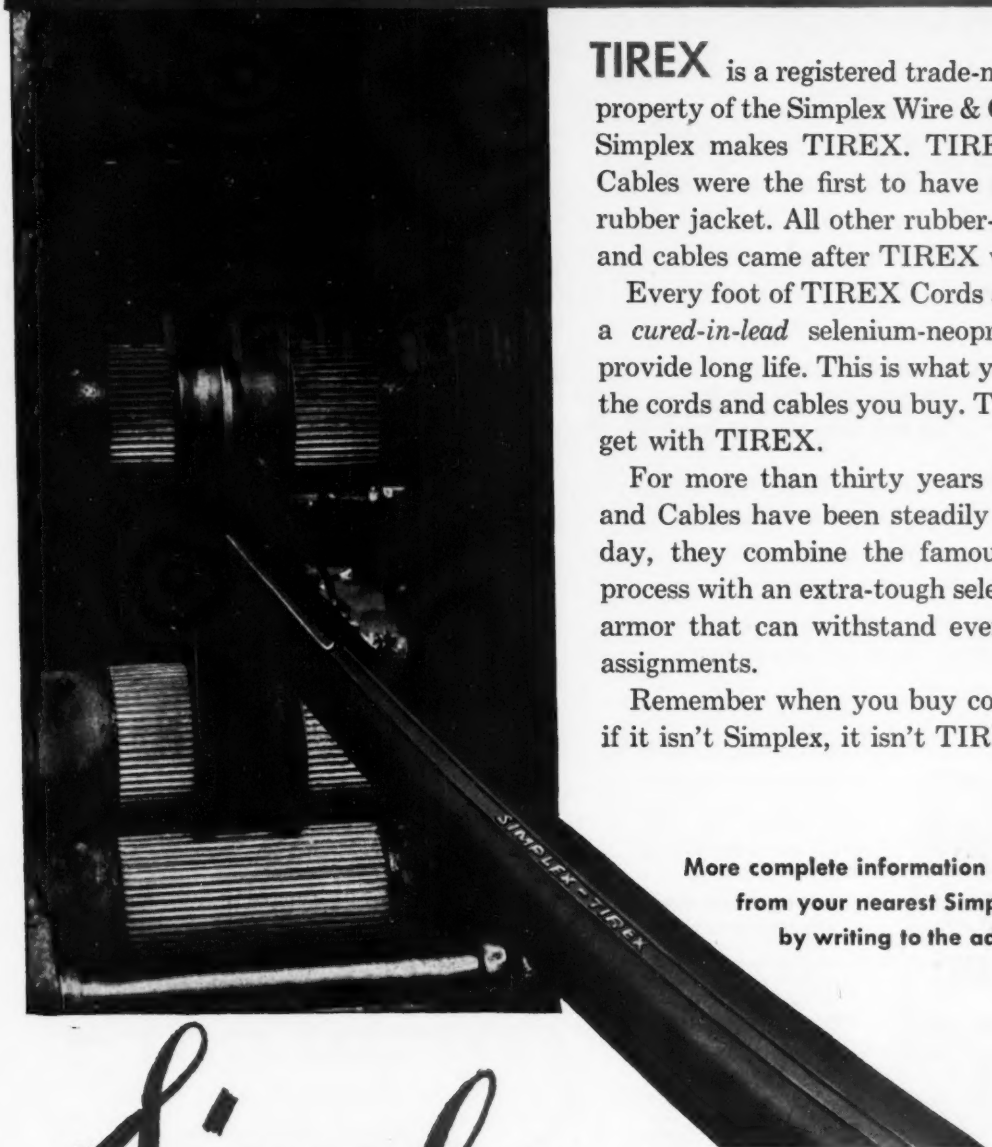
* * * * *

For more information on the products described on these eight pages write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.
CP-11(1011)

YOU CAN BE SURE... IF IT'S
Westinghouse

See Westinghouse story about urban distribution systems on pages 43-46

If it isn't SIMPLEX ...it isn't TIREX!



TIREX is a registered trade-mark and is the property of the Simplex Wire & Cable Co. Only Simplex makes TIREX. TIREX Cords and Cables were the first to have a hard service rubber jacket. All other rubber-jacketed cords and cables came after TIREX was developed.

Every foot of TIREX Cords and Cables has a *cured-in-lead* selenium-neoprene armor to provide long life. This is what you expect from the cords and cables you buy. This is what you get with TIREX.

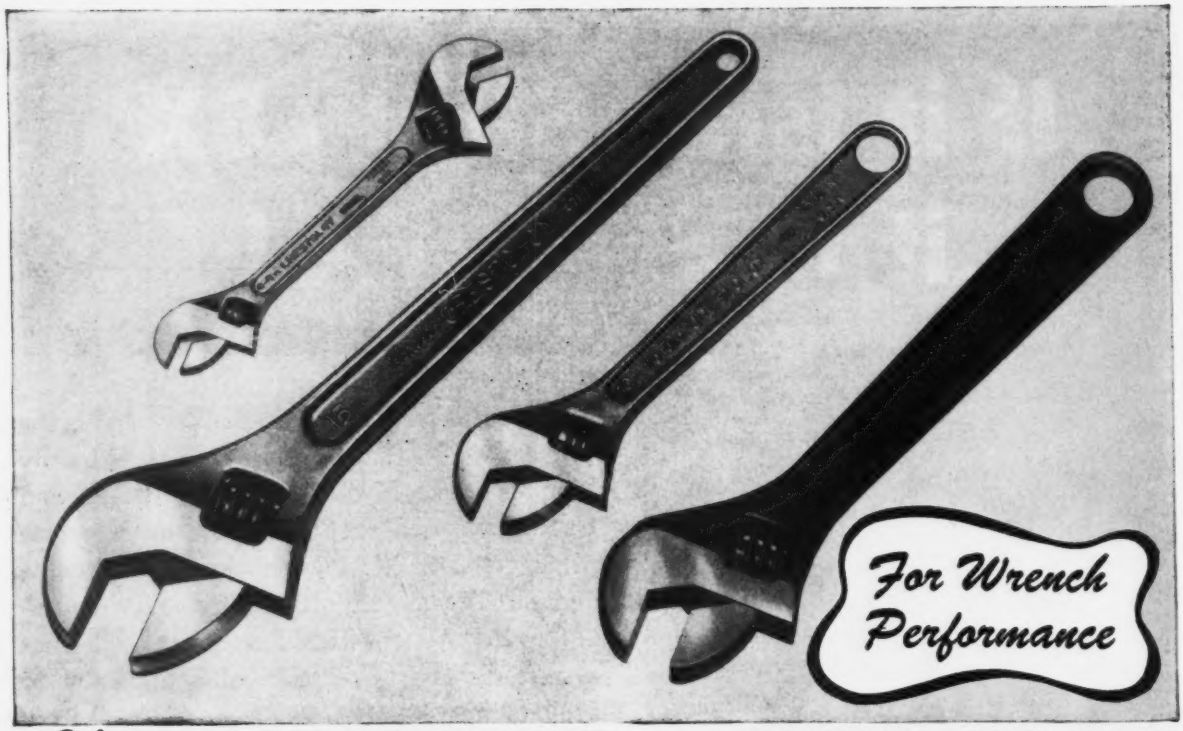
For more than thirty years TIREX Cords and Cables have been steadily improved. Today, they combine the famous *cured-in-lead* process with an extra-tough selenium-neoprene armor that can withstand even the toughest assignments.

Remember when you buy cords and cables, if it isn't Simplex, it isn't TIREX.

More complete information may be obtained from your nearest Simplex distributor or by writing to the address below . . .

Simplex **WIRES & CABLES**

. . . . . SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.



Choose CRESCENT *or* CRESTOLOY

● Since more Crescent and Crestoloy Adjustable Wrenches are sold today than any other brand, an explanation of the differences in these two famous Crescent tools may be appropriate.

CRESTOLOY Wrenches are forged from a special alloy steel permitting thinner, trimmer design with greater strength and less weight than conventional types. They are available in Single End patterns, 4" to 24" size. Double-end in four models combining 4-6; 6-8; 8-10; 10-12 inch sizes.

The 15", 18" and 24" sizes, available in Single End pattern only, are distinguished by their tapered handles. There is no stronger or finer Adjustable Wrench than CRESTOLOY.

CRESCENT Wrenches are forged from selected carbon steel and specially heat-treated to increase their toughness and durability. Due to their lesser cost and relatively great strength, they are widely used in industrial and service operations where thinness is not essential. Available in Single End Patterns, 4" to 18".

Both Wrenches represent the best in design and workmanship, and carry the same guarantee.

GET YOUR FREE COPY!
This new 20-page booklet provides many useful how-to-do-it ideas for both amateurs and professional mechanics, as well as basic information on the proper selection, use and care of hand tools. 93 illustrations. Write today.

CRESCENT TOOLS
Give Wings to Work
®
Sign of the Artisan
Symbol of Excellence

Crescent is our trade-mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by

CRESCENT TOOL COMPANY, JAMESTOWN, NEW YORK

RING BUS in metal-clad switchgear

...without the usual high cost

No costly extra cubicles needed! Ring buses are built into standard units of Allis-Chalmers Metal-Clad Switchgear. This economy, together with their other advantages, makes ring bus schemes more attractive than ever.

Important Advantages

First, there's the flexibility of a ring bus as shown in the single line diagram above. For example, one breaker functions as both a feeder breaker and a bus tie breaker, and it is possible to feed each circuit from either of two breakers. In addition, a ring bus provides continuous service while a circuit breaker is taken out for routine maintenance.

While these advantages can be enjoyed with other circuit arrangements, additional equipment is usually required and it becomes too expensive. As a result, ring bus schemes are often overlooked. But with Allis-Chalmers switchgear a ring bus scheme is simple. The only change from standard construction is the diagonal bus from the front of one unit to the rear of the adjacent unit.

It's time you enjoy the flexibility of a ring bus with Allis-Chalmers switchgear — without the usual high cost.

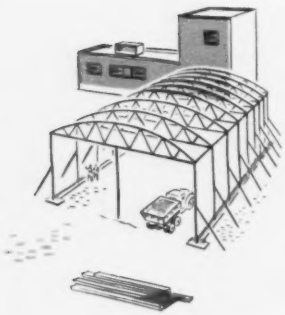
Talk it over with an A-C engineer. Call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wis.

A-4029

ALLIS-CHALMERS A-C ALLIS-CHALMERS

LOAD BUILDERS

INSULATOR SABOTEURS!



Increased industrial activity means increased load demand on power systems—but its by-product, industrial contamination, almost always comes to roost on the insulators that carry the power, and to threaten the dependability of service.

In recent years there have been increasingly frequent reports of leakage current flashovers on major substations and power lines—and of the high cost for changing out or regular cleaning of insulators.

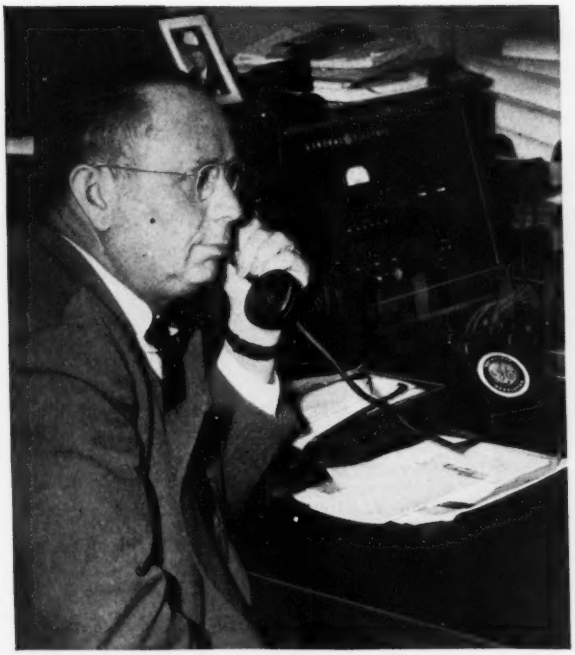
What's the answer to this $64 question? A 25-year-old answer is in the story of Lapp Fog-Type insulator design. Lapp Fog-Type means *longer* leakage distance (on a cost per-inch-of-leakage-distance, cheaper than conventional insulators). More than that, it means a *better* leakage surface, for Lapp Fog-Types have a *uniform* leakage path without narrow shielded hot-spots—and they have a leakage surface exposed to the natural cleansing action of wind and rain.

Many companies have standardized on Lapp Fog-Type insulators for use in all areas of industrial contamination. There are units for all line and substation requirements.

Lapp Insulator Co., Inc., Le Roy, N. Y.

GEORGIA POWER COMPANY...

"Electric service expansion?
G-E Mobile Radio
is our reserve work crew!"



● F. A. "Doc" Nabors, dispatcher at the Macon base station reports emergency crews do 100% better work with 2-way radio.

● All trouble crews in the Georgia Power Co. districts have radio. R. E. King, above, reports completed work . . . gets new job instructions *immediately!*

WITH a radio system that now includes 38 base stations and 360 mobile units, Georgia Power Company has had wide experience in the use of communications for utility service.

G-E 2-way radio plays a vital role in meeting the demands imposed by Georgia's tremendous industrial expansion. Maintenance, construction and emergency service are all co-ordinated with *instant radio communication.* The result: *efficiency of operations has increased* to enable the Georgia Power Company to meet the growing needs for electric power.

1878 75 1953 YEARS OF ELECTRICAL PROGRESS

CALL THE CAS* MAN at our local General Electric office for complete information on G-E 2-way radio equipment for utility companies.

**Communications Advisory Service*

SEND FOR COMPLETE INFORMATION

General Electric Company, Section 1983-10
Electronics Park, Syracuse, N. Y.

Please send me complete information on G-E 2-way radio equipment for utility companies.

NAME.....

ADDRESS.....

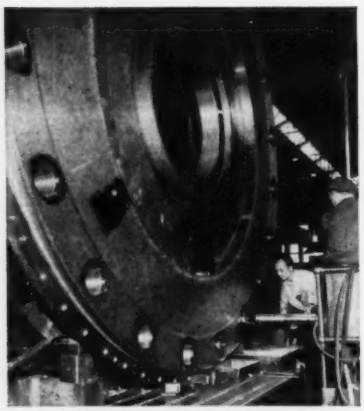
CITY.....STATE.....

GENERAL ELECTRIC

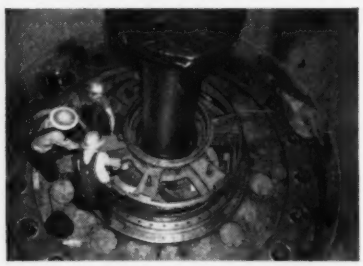
FOUR 17,000 HORSEPOWER BALDWIN FRANCIS TYPE TURBINES INSTALLED AT FORT GIBSON

FORT GIBSON DAM—This view shows (center of photo) the powerhouse in which these turbines are installed.

BALDWIN FRANCIS TYPE TURBINE RUNNER AND SHAFT shown above being lowered into position at Fort Gibson. The total weight of these two parts is 110,400 pounds.

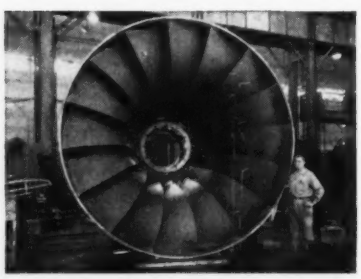


TURBINE MANUFACTURING requires lots of big, precise machine tools to handle the machining of large head covers such as the ones used at Fort Gibson.



THE HEAD COVER, MAIN BEARING AND MAIN SHAFT are shown in the above photo. The workers are busy positioning the guide bearing.

One of the foremost in the design and manufacturing of hydraulic turbines for over 100 years, Baldwin-Lima-Hamilton, together with its subsidiary, the Pelton Water Wheel Company, is among the few firms in the country with the facilities and experience required to produce such important equipment.



DISCHARGE END OF THE RUNNER is shown in this shop view prior to being shipped to the powerhouse site.

BALDWIN-LIMA-HAMILTON

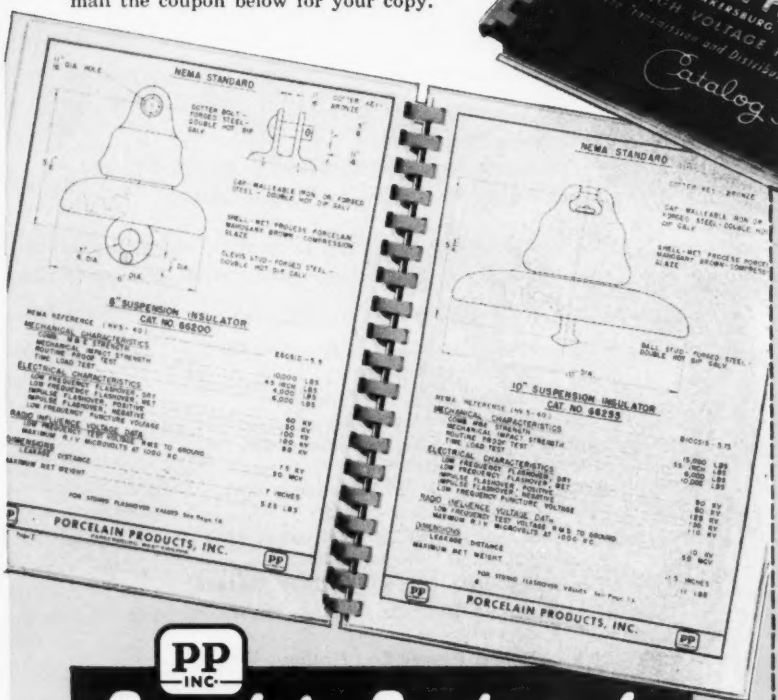
Philadelphia 42, Pa. • Offices in Principal Cities

Just off the Press!

Porcelain Products NEW catalog No. 53

REGARDLESS OF YOUR TITLE

If you buy, specify, stock or install high voltage insulators and fittings, Porcelain Products gives you the latest and most up-to-date reference for all types of construction in this new Catalog No. 53. It's yours for the asking. Just mail the coupon below for your copy.



PP INC.
Porcelain Products, Inc.
PARKERSBURG, W. VA.

Porcelain Products, Inc.
Parkersburg, West Virginia

Gentlemen:

Please send me a copy of your new Catalog No. 53.

NAME_____

TITLE_____

FIRM NAME_____

STREET ADDRESS_____

CITY_____ STATE_____

Please PRINT or TYPE.

Special Memo to Utility Sales Staffs!

Plan NOW to enter the competitions for the George A. Hughes Awards of 1953

The sales idea or promotional plan that brought unusual success in solving a major appliance merchandising problem in your area can be an award winner in the 1953 George A. Hughes Award Competitions. Why not give it a chance to win recognition for you or your company. Prizes will be awarded this year in the following fields of activity:

- **Electric Range Promotion**
- **Electric Water Heater Promotion**
- **Commercial Electric Cooking Promotion**

Hotpoint took pride in extending recognition to these outstanding utility companies and their employees who were the winners of the George A. Hughes Awards for 1952:

Utility Companies With Over 150,000 Meters

Southern California Edison Co., Los Angeles, Calif.
• Electric Kitchen Promotion

Ohio Power Company, Canton, Ohio
• Electric Range Activity

Pennsylvania Power & Light Co., Allentown, Pa.
• Electric Water Heater Activity

Philadelphia Electric Co., Philadelphia, Pa.
• Electric Dishwasher Activity

Appalachian Electric Power Co., Roanoke, Va.
• Commercial Electric Cooking Activity

Utility Companies With Under 150,000 Meters

Minnesota Power & Light Co., Duluth, Minn.
• Electric Range Activity

Central Ohio Light & Power Co., Findlay, Ohio
• Electric Water Heater Activity

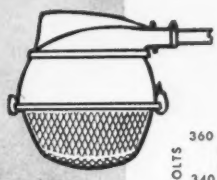
Kentucky & West Virginia Power, Inc., Ashland, Ky.
• Commercial Electric Cooking Activity

The George A. Hughes Awards for 1953 will be based strictly on productive sales ideas. Your company's size or existing conditions will have no bearing on award decisions. Separate prizes will be awarded in the listed fields of activities, and separate prizes will be awarded to companies of under 250,000 meters and to companies of over 250,000 meters.
The 1953 Hughes Award brochures are being mailed to operating electric utility companies and complete details are contained therein. If you need more information, write to Edison Electric Institute, 420 Lexington Avenue, New York 17, N. Y. Plan now to enter one or more competitions.

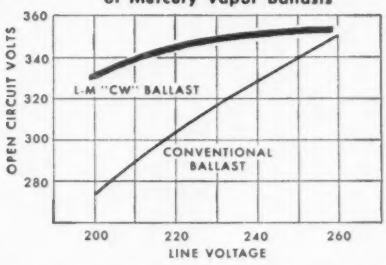
Hotpoint

(A Division of General Electric Company) ***5600 West Taylor Street • Chicago 44, Illinois***

L-M "CW" constant wattage ballast. It assures better circuit characteristics on mercury vapor systems; higher, more uniform lamp output; longer life for both lamps and ballast.



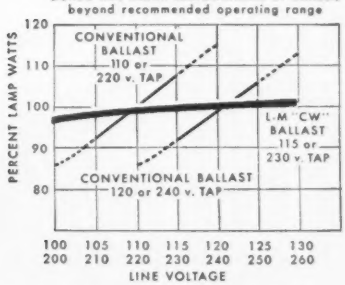
Open Circuit Characteristics of Mercury Vapor Ballasts



Close regulation of open circuit voltage with varying line voltage assures quicker starts with the "CW" during periods of low voltage, a condition most likely to exist at turn-on time.

Lamp Wattage Regulation of Mercury Vapor Ballasts

Dotted line shows characteristics of ballasts beyond recommended operating range



Lamp Wattage Regulation of EH-1 mercury vapor lamp, with L-M "CW" and conventional autotransformer ballasts.

L-M's New "CW" Ballast Provides Constant Wattage for Mercury Vapor

New ballast provides wattage regulation better than 3%, even if voltage varies as much as 10%. This close regulation increases lamp efficiency, lengthens lamp life.

L-M's new "CW" constant wattage ballast offers many advantages over conventional ballasts. Designed for close regulation of lamp light output, the "CW" ballast assures full return on your invested dollar, because it keeps lamps operating at full efficiency.

The constant wattage characteristics of this new ballast eliminate the need for voltage taps, and make possible satisfactory operation on circuits with fluctuating voltage.

Additional Advantages

The improved open circuit characteristics of the "CW" permit continuous operation on open circuit, a condition existing when lamps fail. It has a maximum temperature rise of only 38°C. under continuous open circuit; thus there is no danger of damaging insulation as a result of overheating.

Reduced lamp and line current on starting gives improved system operation, and permits the operation of larger groups of lamps.

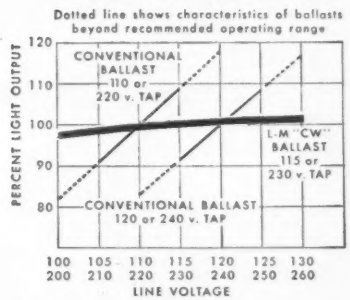
Get The Whole Story

Curves at right show the extent to which these advantages may be realized. Get details from the L-M Field or Lighting Engineers. Or write for Bulletins, to Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

"CW" is a Line Material Company trademark

Light Output Regulation of Mercury Vapor Ballasts

Dotted line shows characteristics of ballasts beyond recommended operating range



Light output regulation with L-M "CW" and conventional autotransformer ballasts. Note that a 10% change in voltage makes barely 3% difference in light output with the "CW," whereas with conventional ballasts, light output drops as much as 18%.

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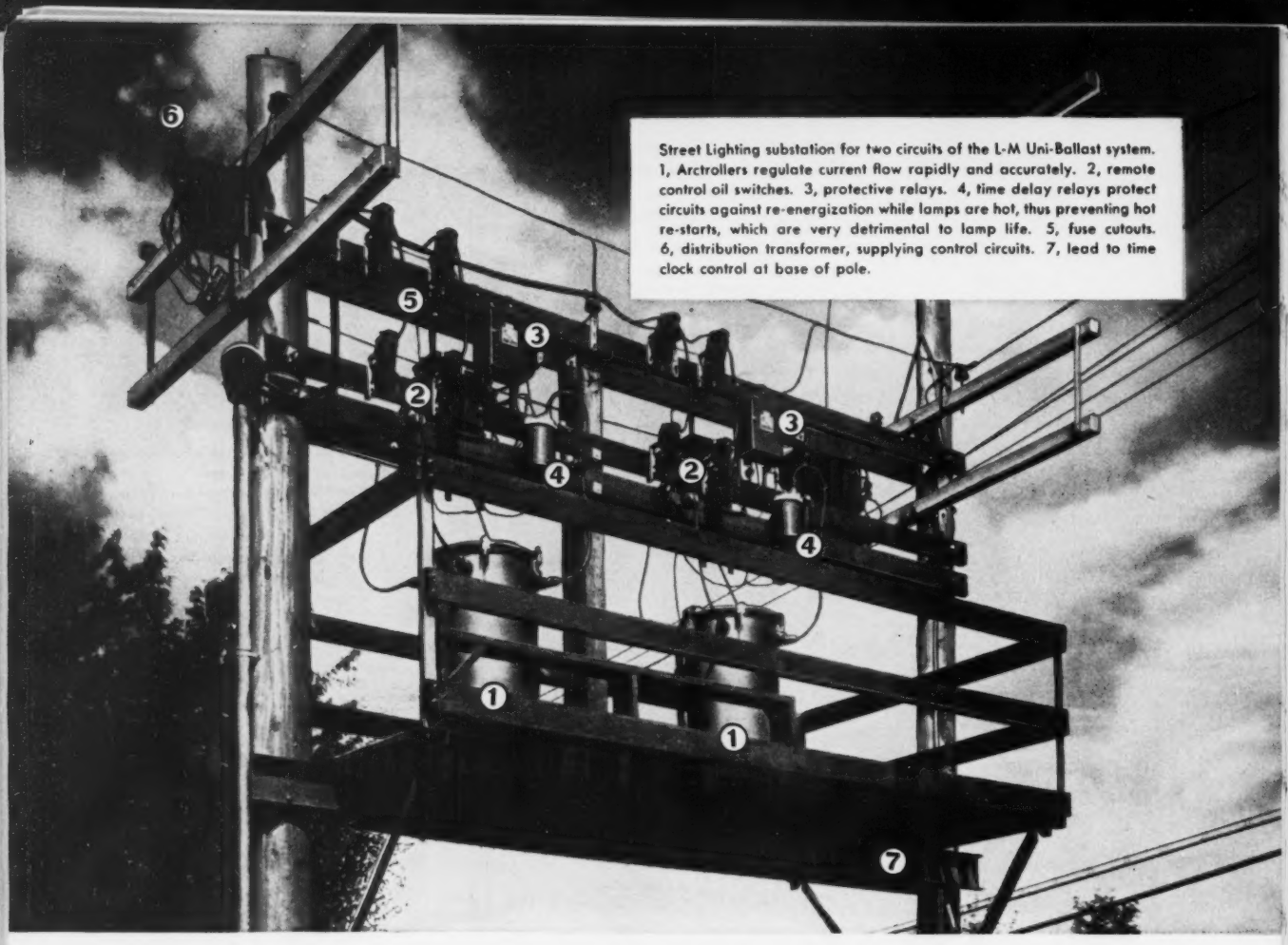
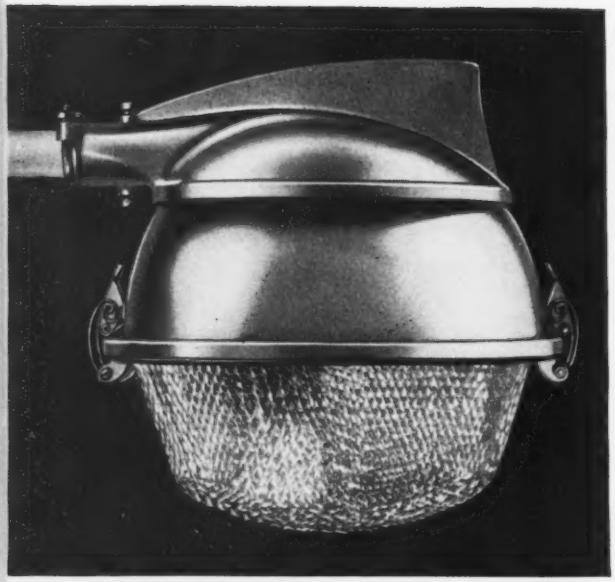
LINE MATERIAL

Street Lighting



Street Lighting substation for two circuits of the L-M Uni-Ballast system. 1, Arctrollers regulate current flow rapidly and accurately. 2, remote control oil switches. 3, protective relays. 4, time delay relays protect circuits against re-energization while lamps are hot, thus preventing hot re-starts, which are very detrimental to lamp life. 5, fuse cutouts. 6, distribution transformer, supplying control circuits. 7, lead to time clock control at base of pole.

L-M Uni-Ballast System



L-M's Ovalite is a highly effective mercury vapor luminaire for installations using the L-M Uni-Ballast system.

Features of the L-M Uni-Ballast System

A new system for the operation of mercury vapor street lighting luminaires

1 Eliminates Ballasts: With the Uni-Ballast system, up to 25 lamps are operated on one Arctroller, a static-type regulator. Individual ballasts are eliminated—resulting in important savings.

2 Simplified Construction: Elimination of ballast housings makes this substantial expense unnecessary, and gives a simpler, neater installation.

3 Higher Electrical Efficiency: The Uni-Ballast system saves 10 to 11 per cent of the electrical energy required by an individual-ballast system. Power factor of the Uni-Ballast system is 95%, compared to 38% for a moving-coil regulator. Line loss is reduced 75%.

4 Simplified Control: The Uni-Ballast system carries up to twenty-five 400-watt mercury vapor lamps with a single control station.

5 Better Cold Weather Starting, longer lamp life: adequate voltage is available for starting lamps down to 40° below zero. Therefore no half-load starters or other auxiliary starting devices are needed. Time delay relay prevents hot re-starts, which cut lamp life.

6 Reduces Wiring Material: Where new conductor is being installed, the amount of copper for circuit wiring can be reduced by more than 50%, as compared with multiple ballast systems.

7 Gives Full-Load Operation: The Arctroller will start strings of lamps up to its full rated capacity. A 10 kw Arctroller handles twenty-five 400-watt lamps, which, on a conventional series-ballasted system, would require a 25 kw regulator.

"Uni-Ballast" and "Ovalite" are Line Material Company trademarks

L-M Uni-Ballast-operated mercury vapor street lighting system in South Milwaukee, Wis., one of the first cities to adopt the system. Mayor Dean L. Potter reports substantial savings in both installation and operation, and complete satisfaction with the system.

Saves Up To $90 Per Pole In Mercury Vapor Street Lighting

by **M. C. HARSH**
Manager Lighting Service
Line Material Company

With L-M's Uni-Ballast system of series mercury vapor street lighting, you eliminate individual ballasts, which results in a saving of material and installation cost. You can save the extra cost for steel transformer base housings or pole top mountings. You can save on conductor.

The Uni-Ballast system utilizes the Arctroller, which regulates the power flow in the system to correspond to lamp requirements. Being a static type regulator, the Arctroller reduces surges on the secondary circuit to a minimum. The Arctroller operates with split-second timing to regulate the circuit to predetermined values. Uni-Ballast relieves the system designer of voltage-drop problems usually associated with long spacing between luminaires on multiple systems.

Higher System Efficiency

Electrical efficiency is increased. Individual ballast losses consume about 11% of the rated lamp watts. The single L-M Uni-Ballast Arctroller has a transformation efficiency of about 94%.

Power factor is improved. The Uni-Ballast system provides a 95% power factor, compared with a factor of 38% for a moving coil regulator.

You get better lamp operation, because the characteristics of the regulated power supply are coordinated with those of the lamps. Line loss can be reduced to about 25% of that of a series-operated ballast system.

Many Other Advantages

The Uni-Ballast system provides single point control. Cold weather starting is greatly improved. In a new installation, smaller conductor may be used, as line losses for a given size conductor with the Uni-Ballast system are only 25% of those with the standard series-operated ballast system.

Lamps last longer, because the time-delay device prevents re-starts when lamps are hot—an operating condition detrimental to lamp life.

The L-M Arctroller, the heart of the Uni-Ballast system, can be operated up to its full load capacity. A 10 kw Arctroller can handle 25 400-watt lamps, where the conventional series-ballasted system would require one 25 kw regulator.

Ask L-M Field Engineers for Complete Information

L-M's Uni-Ballast system offers many advantages. Ask the L-M Field Engineer for a complete discussion on its pros and cons and about L-M's outstanding lighting engineering service. Or write Line Material Company, Street Lighting Division, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

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LM® LINE MATERIAL *Street Lighting*

Why L-M Round-Wound Transformers Have Such High Short-Circuit Strength

by **JAMES G. EVERHART**
Chief Engineer
Transformer Division
Line Material Company

One of the desirable characteristics of L-M Round-Wound transformers is their exceptionally high short-circuit strength. Partly this is inherent in the way we wind round coils on a wound core. But further, this strength arises from the exceptionally good mechanical design.

Effects of Short Circuits

Short circuits exert two forces—radial and axial. Under radial forces, rectangular coils tend to assume a round shape. Being already round, the coils on Round-Wound transformers resist these radial forces much better than do rectangular coils. (Figs. 1 and 2).

Axial forces tend to telescope the windings. Although failure is progressive, it can occur almost instantaneously. If the coil starts to telescope, the electrical centers of the coils are abnormally displaced. This results in a greater axial component which increases the force and the movement, leading to complete failure. (Figs. 3 and 4).

In larger transformers the mechanical forces involved can amount to thousands of pounds. Therefore in Round-Wound transformers we pay special attention to providing a mechanical structure sufficiently strong to support and hold the coils in position in the assembly.

This structure requires a rigid steel frame, firmly tied together vertically (Fig. 5), and properly designed blocking (Fig. 6). Even leads must be strongly clamped (Fig. 7), since great mechanical forces may exist between adjacent leads.

Varnish Selection

Correct application of the proper varnish provides a bond between layers of insulating paper and coil sections which contributes to short-circuit strength. We have developed a variety of tests for varnish, including a mechanical test of bonding strength. (Fig. 8). These tests enable us to select those few varnishes which combine the highest mechanical and electrical strength with other desirable qualifications.

The overall result of design, construction, selection of materials, and careful manufacture has given L-M Round-Wounds unusually high short-circuit strength, which contributes to an extremely low rate of failure.

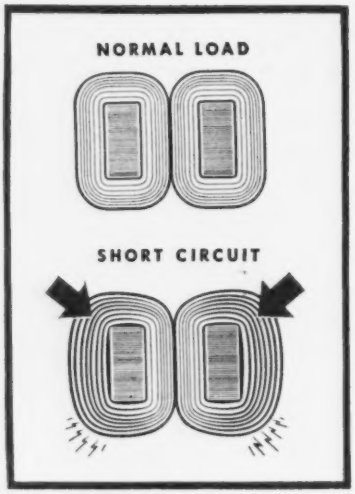


FIG. 1. Radial forces existing under short-circuit currents make rectangular coils tend to become round. The forces may be violent enough to damage insulation, or may completely destroy the coils.

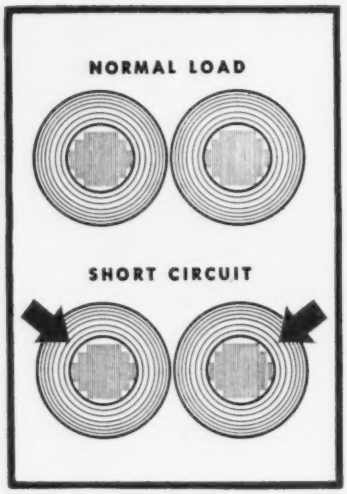


FIG. 2. Since the coils of Round-Wound transformers are already round, short-circuit radial forces cause no distortion. Thus Round-Wounds have inherently higher short-circuit strength.

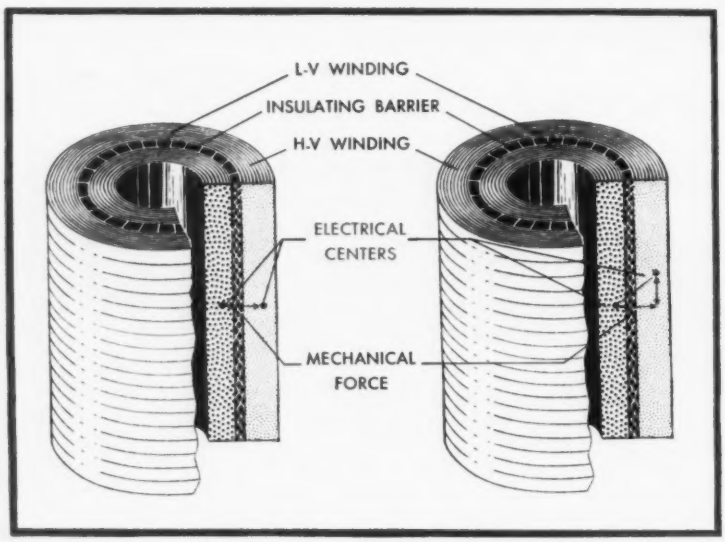


FIG. 3. Diagrammatic vertical section of coil showing primary and secondary electrical centers on the same horizontal plane. Under short circuits, all forces are radial and windings tend to repel each other in a horizontal plane. But even though coils can be designed with the electrical centers on the same plane, manufacturing tolerances cause some variations; and tap changer operations will cause some unbalance.

FIG. 4. With electrical centers displaced vertically, the force between the centers has both radial and axial (vertical) components. Axial forces cause the windings to telescope and separate vertically. Any displacement increases the vertical force component between them, which progressively compounds to complete destruction of the coils. The rigid construction of Round-Wound transformers prevents the slightest movement.

LINE MATERIAL Transformers

Compare the Things That Count

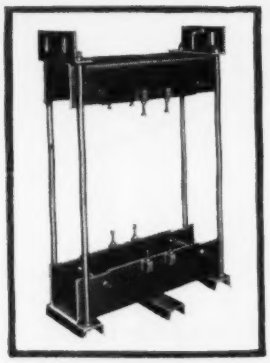


FIG. 5. Heavy steel frame provides a rugged mechanical structure that is firmly tied together vertically. It is sufficiently strong to support and hold coils in position in the assembly.

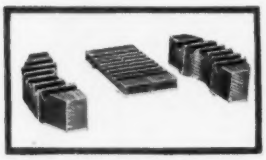


FIG. 6. Sturdy kiln-dried, oil-impregnated, shaped maple blocks give maximum contact and support to coil-edge surfaces. These are assembled and clamped so that they cannot move out of position under short-circuit forces.

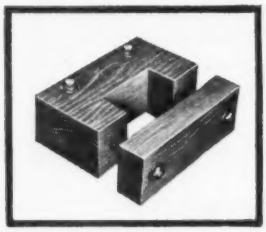


FIG. 7. Under short-circuit conditions, great mechanical forces exist between adjacent leads—especially in large transformers. These leads are strongly clamped so they cannot be harmfully displaced.

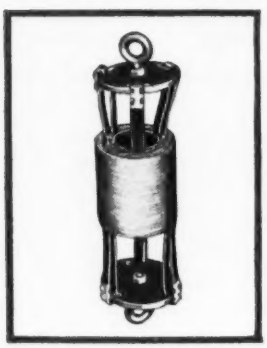


FIG. 8. Here is a coil impregnated with a test varnish set up for a pull test—which will determine whether the varnish has adequate bonding strength. This is just one of the tests L-M has developed to select the best varnishes for Round-Wound transformers.

"Round-Wound" is a Line Material Company trademark

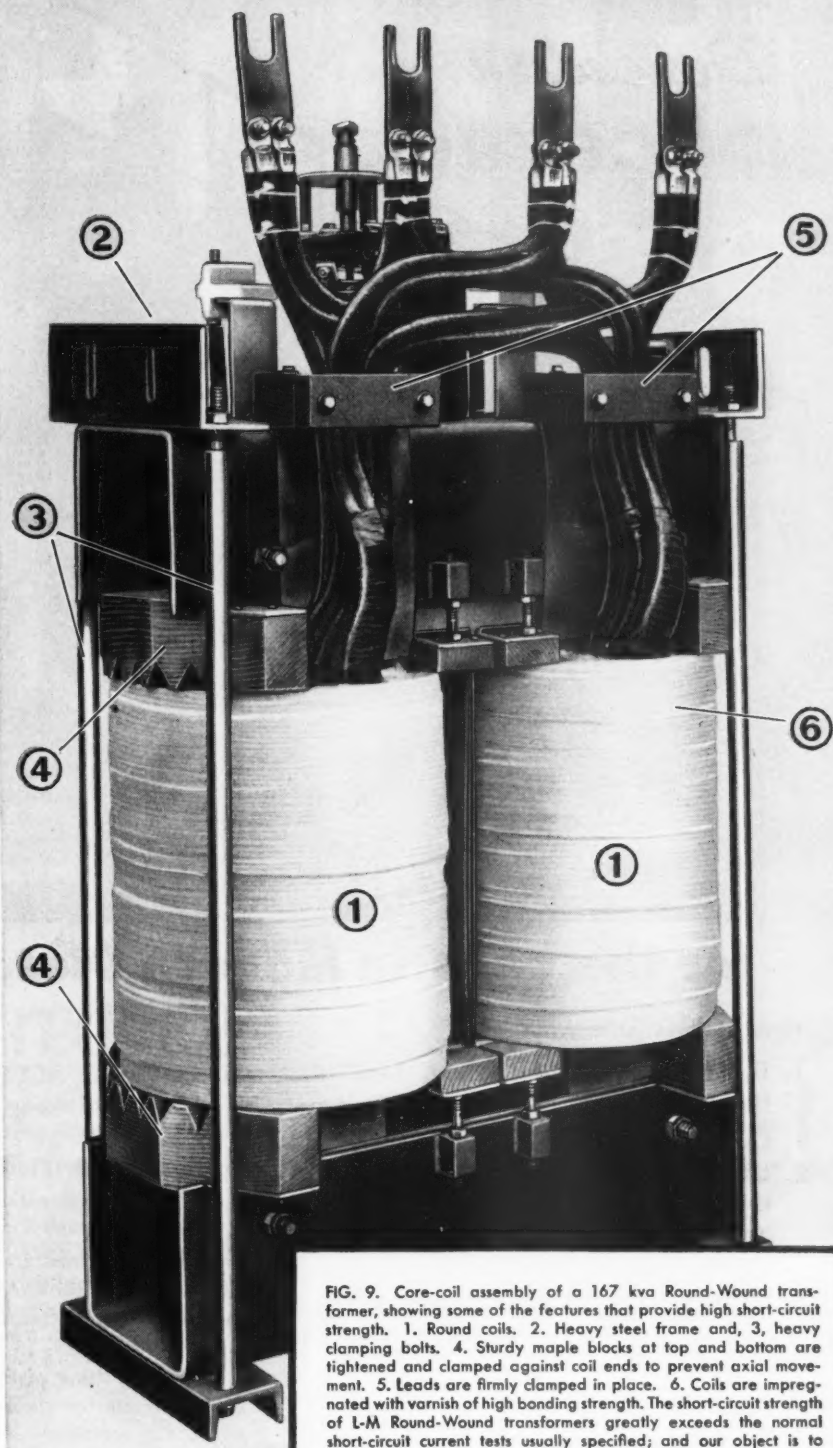


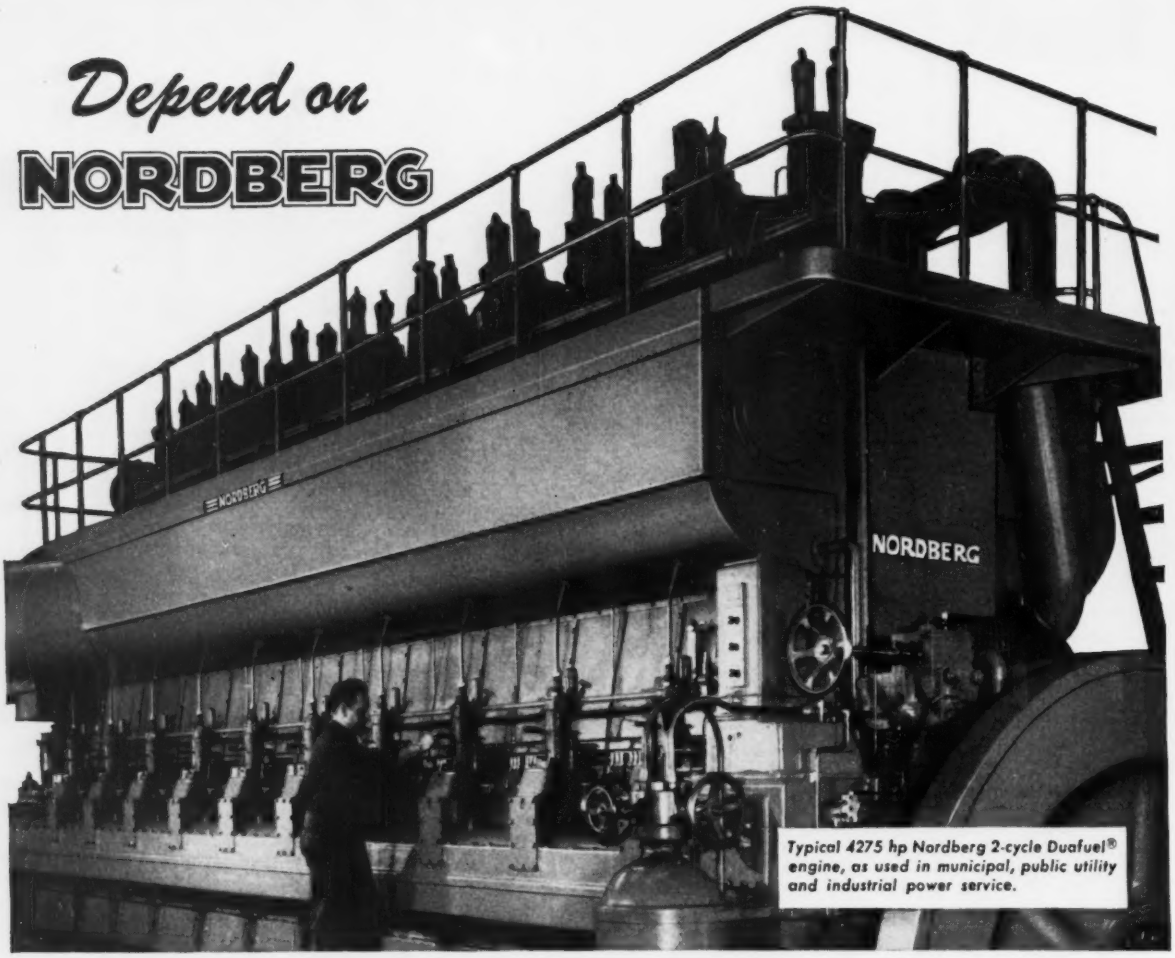
FIG. 9. Core-coil assembly of a 167 kva Round-Wound transformer, showing some of the features that provide high short-circuit strength. 1. Round coils. 2. Heavy steel frame and, 3, heavy clamping bolts. 4. Sturdy maple blocks at top and bottom are tightened and clamped against coil ends to prevent axial movement. 5. Leads are firmly clamped in place. 6. Coils are impregnated with varnish of high bonding strength. The short-circuit strength of L-M Round-Wound transformers greatly exceeds the normal short-circuit current tests usually specified; and our object is to build transformers that will withstand *dead* short-circuit currents.

Get Complete Information About L-M Round-Wound Transformers

We'd appreciate an opportunity to give you full information about the many desirable characteristics of these outstanding transformers. We'd like you to compare them with others—"Compare the things that count!" Ask the L-M Field Engineer for information; or write for new Bulletin DT-1 to Line Material Co., Transformer Div., Zanesville, Ohio (a McGraw Electric Company Division).

Depend on

NORDBERG



Typical 4275 hp Nordberg 2-cycle Duafuel® engine, as used in municipal, public utility and industrial power service.

for the BEST in Modern Diesel Power

Here are 6 reasons why:

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Heavy duty construction unmatched for long life and trouble-free operation.

2. UNEQUALLED EXPERIENCE
Heavy machinery builders since 1890, Nordberg produces America's largest line of heavy duty Diesels.

3. ECONOMICAL AT ALL LOADS
Controlled fuel injection assures maximum fuel economy.

4. CONTROLLED POWER
Instantaneous response to changing load conditions.

5. COMPLETE ACCESSIBILITY
Simplicity of design and construction makes all parts readily accessible.

6. LOW MAINTENANCE
Advanced engineering results in less maintenance cost per kilowatt-hour.

Nordberg Engines are now built in sizes from 10 to over 10,000 horsepower in a single engine . . . including Diesel, Duafuel® and Spark-Fired Gas Burning types.

When you think of POWER—think of NORDBERG. Write for further details, outlining your power requirements.

NORDBERG MFG. CO., Milwaukee, Wis.

P353

BUSCH SULZER
A DIVISION OF NORDBERG

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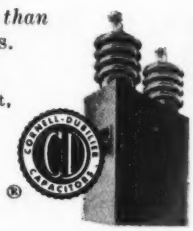
INSTALLED 1942

...still requires practically no maintenance!

This C-D capacitor installation has been in continuous operation for a large utility since 1942. Its field performance record is one of dependable service year after year, with little or no maintenance required. A typical report of just one of *more than 4,000 field-proved* C-D installations.

If you are considering an installation of capacitors for power-factor improvement, you can save maintenance dollars by talking it over with a C-D engineer. Cornell-Dubilier Electric Corp., Dept. D-83, South Plainfield, N. J.



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The AIM of most manufacturers is to provide customers with a GOOD product

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. . . . in DURABILITY
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The audit of variables in these factors is the cooperation afforded by

ELECTRICAL
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2 EAST END AVENUE AT 79th STREET, NEW YORK 21, N. Y.

One of the largest network transformers ever built (2000 kva) being installed in vault at Pittsburgh's new Gateway Center.

How one Utility efficiently handled a 5-year 30,000-kva network increase.

Pittsburgh's tremendous load expansion over the past five years has been successfully met by sound network planning by the Duquesne Light Company.

Westinghouse Secondary Network Transformers played a large part in helping them do their job quickly and efficiently. Sizes varied from the nominal 500-kva rating at 216 volts wye, up to the unusually large 2000-kva rating at 480 volts—some of the largest network transformers ever built!

The reliability of network transformers is a necessary factor in any network system. That's why Westinghouse Network Transformers have continuously wound coils of sliverless copper to guard against hot spots, crystallization and punctured or scored insulation. That's why, too, they're liquid-filled under vacuum and have welded-on covers to assure a perfect seal.

What are your network transformer problems? Your local Westinghouse representative will be glad to discuss them. Call him today—or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70690

YOU CAN BE SURE...IF IT'S Westinghouse

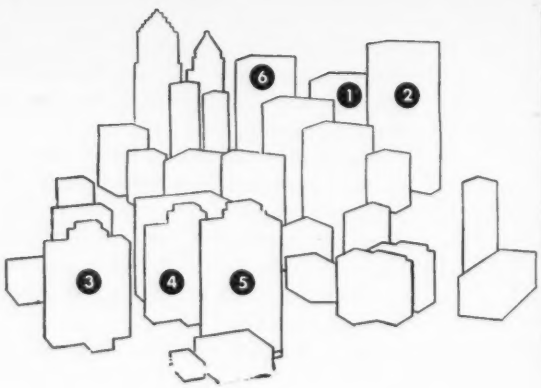
Stewart Love, Pittsburgh Press

NETWORK SYSTEMS PAY IN

PITTSBURGH

The following locations are representative of the recent network installations in downtown Pittsburgh:

1) Carlton House Hotel
2) 525 William Penn Place Bldg., (Mellon-United States Steel)
3, 4, 5) Gateway Center Buildings No. 1, No. 2 and No. 3
6) Alcoa Building



A 10-time load increase . . .
made possible by sound system engineering

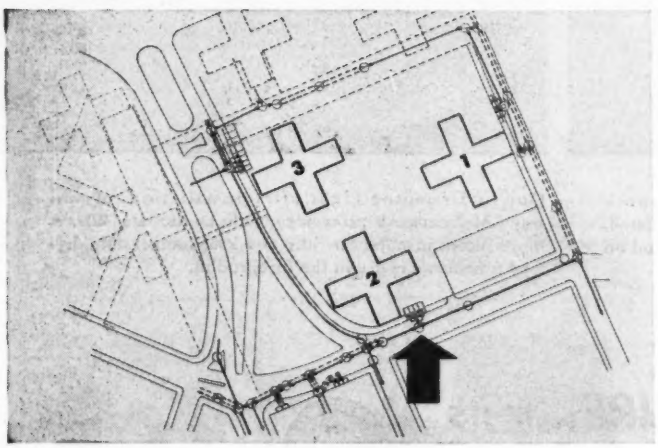
The dramatic reshaping of a new skyline in Pittsburgh is attracting national attention. Utility planners who face similar civic rejuvenation can appreciate the Duquesne Light Company's achievement in handling this load growth.

Duquesne Light actually began getting ready for this huge expansion in 1926, when they installed a secondary network to provide Pittsburgh's triangle with the highest quality service. Badly congested primary feeders and many small transformer installations were eliminated. As large commercial buildings were erected, network equipment was installed.

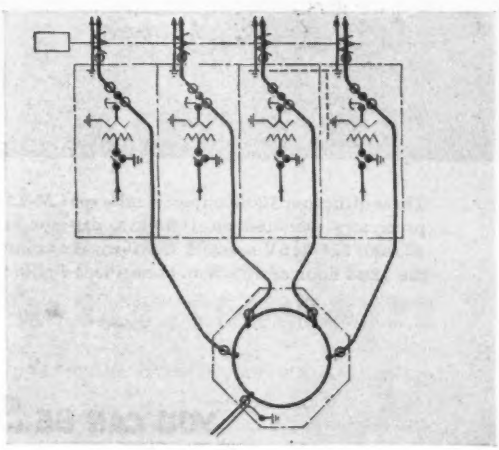
During the last five years, the network load has increased from 40,000 kva to 70,000 kva. In order to permit this growth, the Duquesne Light Company utilized a variety of network applications. A 4-unit network installation in the Alcoa Building, a 4-unit and a 5-unit network installation in the new United States Steel Building, and multiple unit network installation with street ties in the Gateway Center Group. These various systems employ both ventilated and submersible dry types, as well as liquid-cooled transformers.

The basic downtown network, installed 27 years ago, has grown to 10 times its original load . . . has proved flexible and adaptable in keeping pace with Pittsburgh's growth. The range of Westinghouse network equipment enables you to employ the type of network system that best suits your local needs. Westinghouse Engineers are ready to help in your network system planning. Call your nearby Westinghouse office or write Westinghouse Electric Corp., Post Office Box 868, Pittsburgh 30, Pa. J-97172

YOU CAN BE SURE...IF IT'S
Westinghouse



Network secondary layout is shown for the present Gateway Center Buildings, No. 1, No. 2 and No. 3. This can be expanded to accommodate the additional buildings.



A typical network installation which serves Building No. 2 in the Gateway Center Group is shown in this single line schematic diagram.

Westinghouse Network Protectors have paced growth requirements

Available space for network protector installation and minimum maintenance characteristics are important considerations for any network expansion—particularly in a high-density, downtown area like Pittsburgh's Gateway Center.

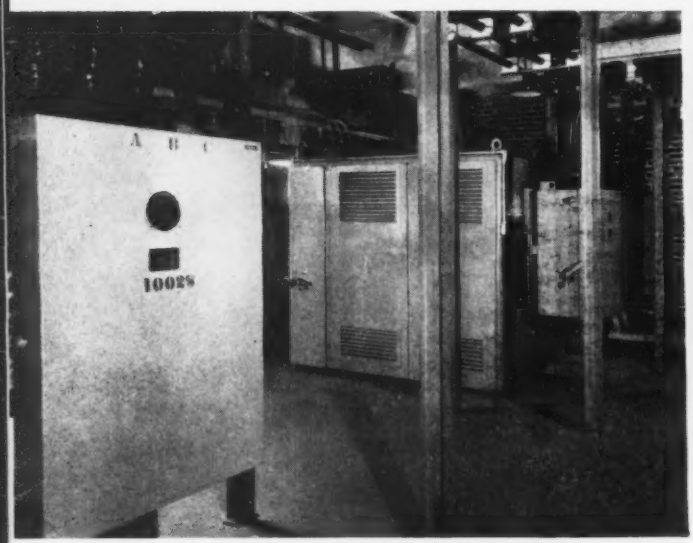
The Westinghouse Type CM-22 Network Protector, as used in accommodating Pittsburgh's growth, features "De-ion®" circuit breakers with reduced contact break distance, front-mounted, lever-type mechanism and smaller, yet more dependable, relays—all features resulting in overall protector size reduction.

Maintenance is minimized because the "De-ion" arc chamber reduces main contact duty. All adjustments are eliminated except relay settings. Dismantling the protector for inspection is facilitated with captive hardware throughout.

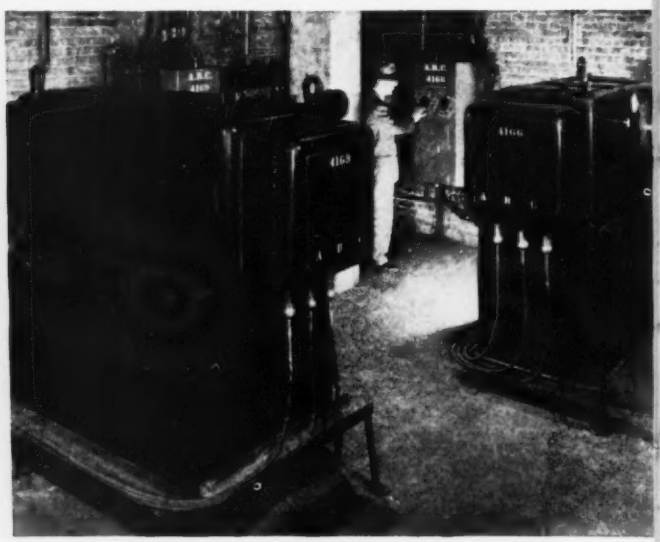
You, as Duquesne Light Company did, can realize the simplicity and convenience of these important Westinghouse features as you make plans to expand your network system.

Call your Westinghouse representative for more detailed discussion or write Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

J-60825



Three of the four 3000-ampere, vault-type CM-22 network protectors mounted on 1000-kva, dry-type ventilated, 12,000/125-216V network transformers as installed on the 32nd floor of 525 Wm. Penn Place Building.



One of Duquesne Light's first installations of subway CM-2 network protectors made in the late '20s. A more recent installation—the 300-kva, submersible dry-type transformers are in the foreground.

YOU CAN BE SURE...IF IT'S Westinghouse

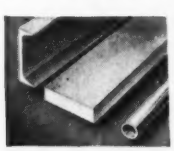
ALCOA Responsibility...

and a fist full of books!

Alcoa currently publishes hundreds of booklets and pamphlets—over twenty-five dealing with aluminum electrical conductors alone. Their subjects range from products to procedures, their titles from *Aluminum Bus Conductors* to *Voltage-Drop Charts for Insulated Aluminum Cable.* You'll see them on the desks of men in all phases of the electrical power industry.

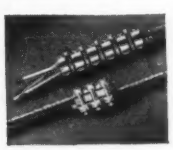
At first blush, publishing seems a far cry from the aluminum conductor business. For many companies, it is; but not for Alcoa. This technical literature is the printed product of Alcoa's sense of responsibility toward customers. A responsibility to help them make the best use of the best product. A responsibility we assumed when we introduced aluminum electrical conductor over 55 years ago. Aluminum Company of America, 2100-H Alcoa Building, Pittsburgh 19, Pennsylvania.

Alcoa Aluminum Bus Conductors are available in rectangular bars, solid round bars, channels and tubular shapes.



Alcoa Aluminum Electrical Conductors include Aluminum Cable Steel Reinforced, solid and stranded aluminum wire, bare and covered.

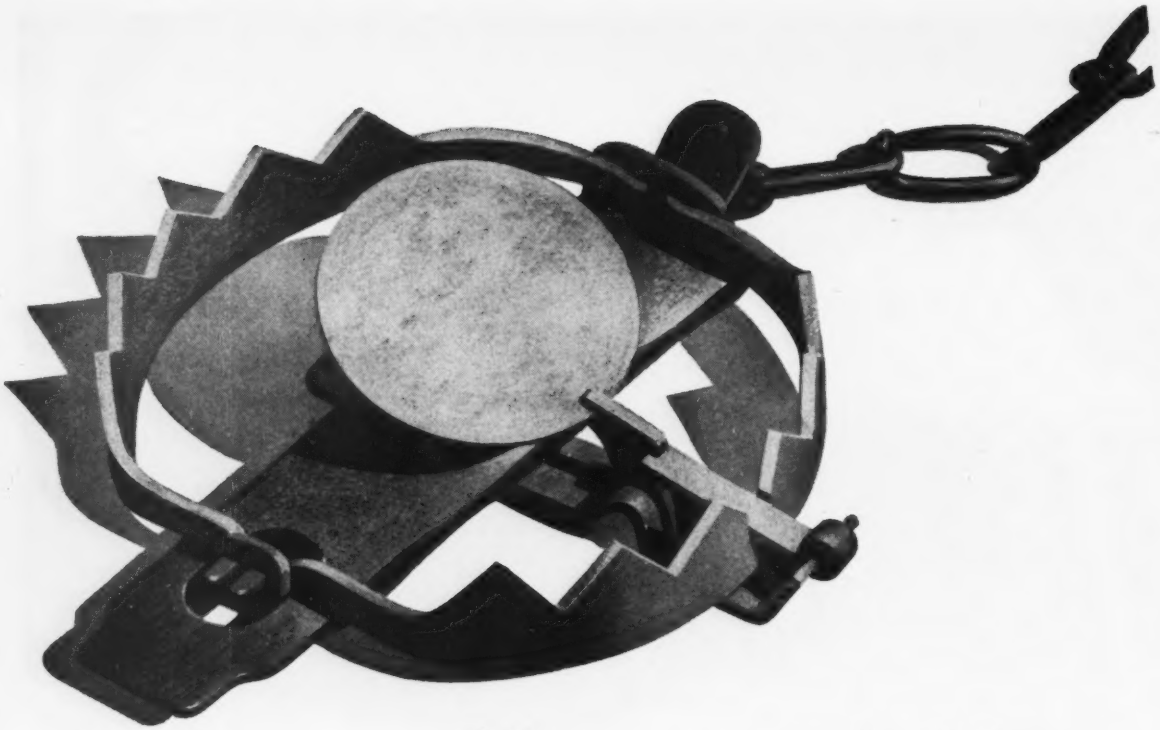
Alcoa manufactures aluminum accessories correctly designed for use with aluminum conductors.



Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

"SEE IT NOW" with Edward R. Murrow—CBS-TV every Sunday—brings the world to your armchair. Consult your newspaper for local time and channel.



All over your building,
fire sets its traps. In switch gear,
transformer vaults, sub-stations.
In fact, wherever it can
stop your business in its tracks.
Make sure you don't fall victim.
Post a KIDDE Portable Extinguisher
next to every fire hazard.

Kidde

Walter Kidde & Company, Inc.,

830 Main Street, Belleville 9, N. J.

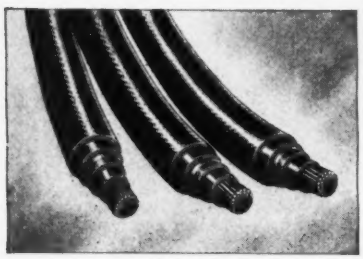
Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

WIRE AND CABLE INFORMATION DIGEST

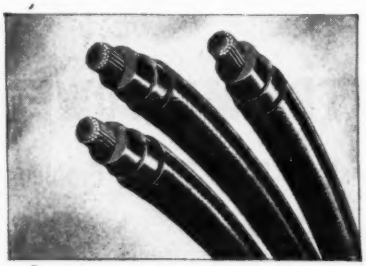
Fast way to wire new or old plants

How much extra current can AVA cables carry?

If you're planning new distribution, or changes in your existing wiring system, it will pay you to look into the savings of G-E Deltabeston* AVA cable. Deltabeston can actually offer as much as 64% more current from your present raceways—can offer more current in most wire sizes. For example:



These 500 MCM Deltabeston AVA cables carry 470 amperes—150 amperes more than standard 60 C cables of the same size. This can mean more current from your present conduit—extra current from every pound of copper.



These standard 500 MCM 60 C cables carry 320 amperes—32% less current than the same size G-E Deltabeston AVA cables. Deltabeston cables permit operation at increased temperatures—offer more current per pound of copper.

Famous G-E No. 1799 varnished cambric and double-asbestos insulation make Deltabeston suitable for operation at high temperature. That's why at normal ambient temperatures it can handle more current than ordinary types.

*Registered Trade-mark: General Electric Company

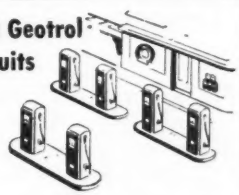
The Ford Motor Company rewired a plant, saved money, and maintained production by using the G-E No. 1799 varnished-cambric-insulated interlocked armor cable system.

It's quite a feat to rewire a plant in a hurry, keep costs in line, and maintain production at the same time. But the Ford Motor Company did just this in their Canton, Ohio plant by using General Electric's No. 1799 varnished-cambric-insulated interlocked armor cable system. All cables were 3-conductor, 500,000 CM for 15 kv service.

Installation speed—The ease and speed with which this interlocked armor cable system can be installed lowers cost. The cable can be laid quickly—indoors or outdoors—in long lengths, around corners, on low-cost aluminum racks. Engineering time is cut. Threading or bending of conduit is eliminated. Splices are of a simple mechanical type. Ford saved months, not days, because of these features.

Permanent—To our knowledge, no installation of interlocked armor cable has ever suffered mechanical damage sufficient to cause electrical failure. It is versatile as well as permanent and makes a neat, clean-looking installation. Booklet, *Interlocked Armor Cable*, describes the system in detail.

Check on G-E Geotrol wire for circuits exposed to gasoline



Where gasoline, or gasoline vapors are present, considerable time and expense can be saved by using G-E Geotrol wire. This U. L. listed wire eliminates the need for bulky, expensive lead-sheathed cable. Because G-E Geotrol wire is easy-to-handle and available in colors it is an excellent choice for wiring gasoline pumps, and for control and similar circuits in refineries.

New Useful Booklet

This new, free booklet tells uses and advantages of General Electric's Super Coronol*-Geoprene nonmetallic power cable—for circuits to 15,000 volts. Men who work with high-voltage cable will find this booklet packed with data that can be put to daily use. Write for your copy.

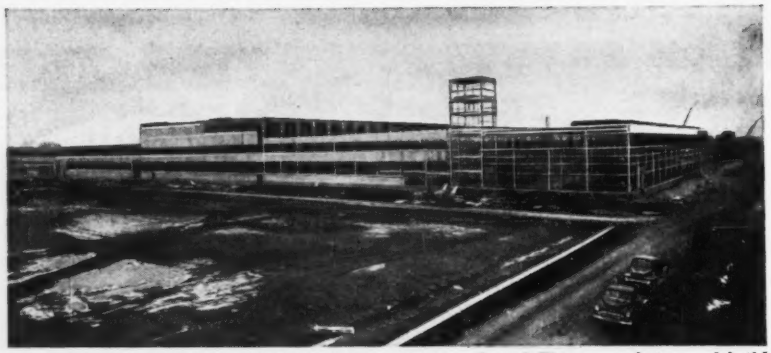
The next time you have a question on cable or want any of the booklets mentioned in this advertisement, call a G-E wire and cable specialist for expert help. You can reach him at the nearest G-E Construction Materials district office. Or, write Section W91-827, Construction Materials Division, General Electric Company, Bridgeport 2, Conn.

1878 75 1953 YEARS OF ELECTRICAL PROGRESS

You can put your confidence in—

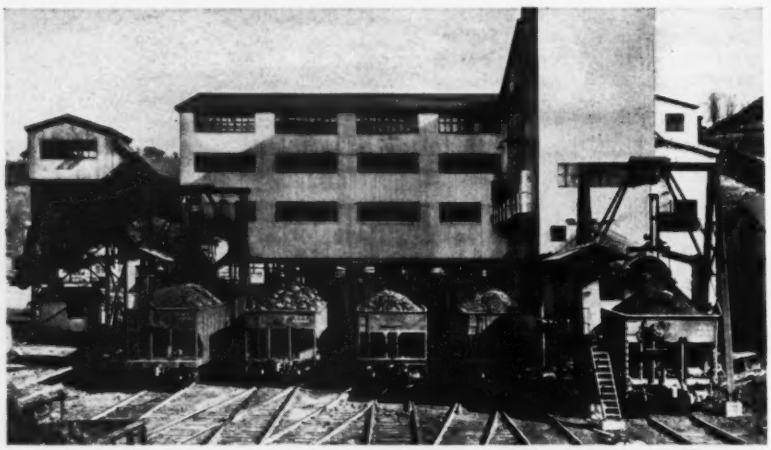
GENERAL ELECTRIC

A LUMBER COMPANY called in Ebasco specialists to make an *engineering study*. Providing an unbiased outside viewpoint, the study was used to improve lumbering operations.



ONE OF THE LARGEST APPLIANCE MANUFACTURERS selected Ebasco to *design and build* this giant plant at Columbus, Ohio. When completed, it will be nearly half a mile long and capable of turning out 4,500 refrigerators a day.

A BAKING CONCERN required assistance in making a *financial study*. Rather than add financial specialists to its permanent payroll, they called in Ebasco to do the job.



A LARGE COAL COMPANY, requiring a *market study*, engaged Ebasco for the job. The study analyzed changes in the anthracite market, the company's dealer and sales organization, sales outlets, possible new uses and markets for anthracite. Ebasco has made sales and marketing studies of both wholesale and consumer markets in many other fields of business.

HOW BUSINESS AND INDUSTRY GET EXTRA MANPOWER

A ROPE COMPANY engaged Ebasco to make a *business study* of its operations. This Ebasco report provided management of the company with a workable "blueprint for future action."

Companies Call on Outside Specialists to Solve Special Problems

As industry grows, so do the problems industry faces. These problems are just as common—and just as complex—to small firms as they are to large corporations. That's why companies of different sizes, in different fields, call on Ebasco to supplement the personnel of their own organizations.

Ebasco specialists—men whose technical talents are at a premium in today's tight manpower market—provide these companies with required services without adding to permanent payrolls, over-burdening busy staffs or wasting the valuable time of top executives.

Perhaps Ebasco can provide extra manpower to help solve *your* special business problems. For your copy of our booklet, "The Inside Story of Outside Help," write: Ebasco Services Incorporated, Dept. M, Two Rector Street, New York 6, N. Y.

NEW YORK • CHICAGO • WASHINGTON, D. C.

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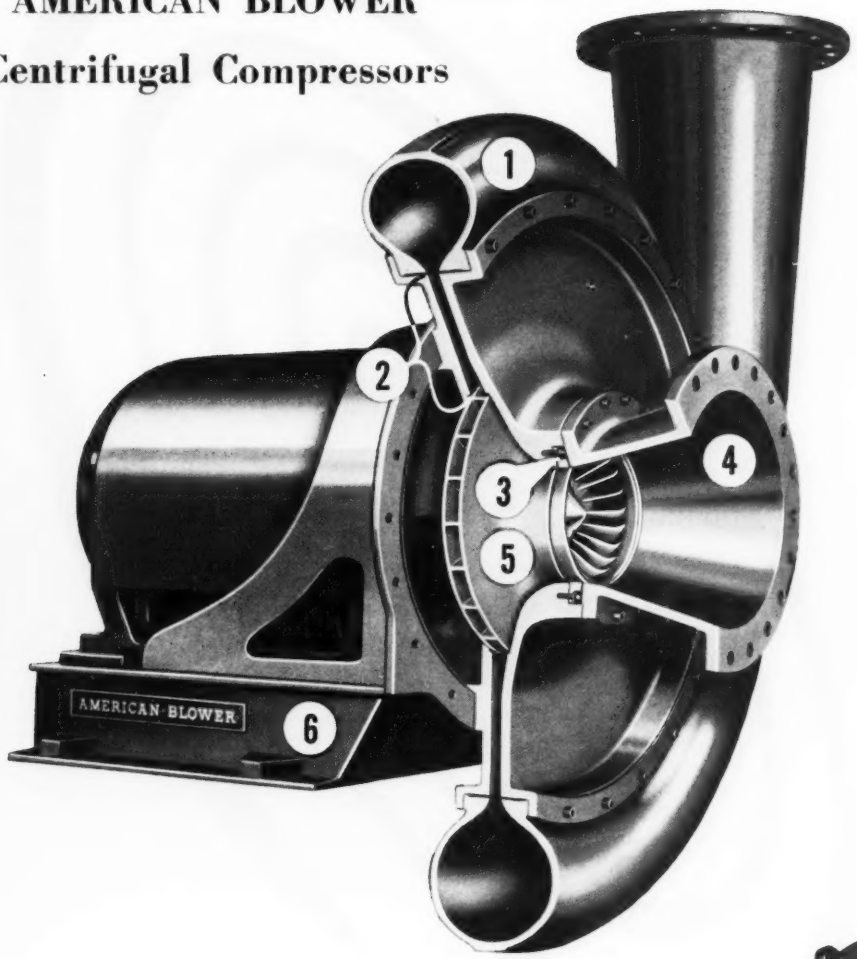
ENGINEERS · CONSTRUCTORS · EBASCO · BUSINESS CONSULTANTS

Ebasco Teamwork gets things done anywhere in the world

AMERICAN BLOWER

Centrifugal Compressors



American Blower Centrifugal Compressors offer outstanding design features which improve efficiency, facilitate installation and minimize maintenance.

In the cutaway view, above: (1) Improved, scroll-shaped, casing design increases compressor efficiency. (2) Unobstructed diffuser passage efficiently converts velocity energy into pressure. (3) Annulus packing, having machined labyrinths, minimizes recirculation of gas around the impeller inlet. (4) Removable inlet nozzle. (5) Aerodynamic design of impeller blades results in high efficiencies. (6) Welded-steel baseplate "stress relieved" prior to machining, assuring maintained alignment.

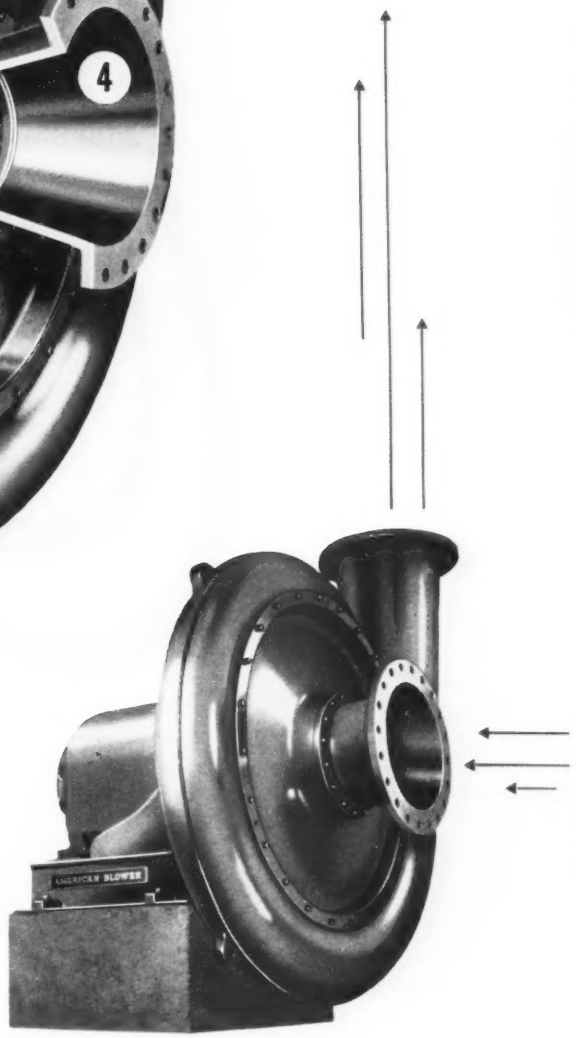
For data, ask our nearest branch office.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary corporation

AMERICAN BLOWER

YOUR BEST BUY IN AIR HANDLING EQUIPMENT



American Blower Single Stage Centrifugal Compressors are available in sizes 30 to 600 h.p., and pressures 1¼ to 3¾ lbs.

Serving home and industry

AMERICAN-STANDARD · AMERICAN BLOWER · CHURCH SEATS & WALL TILE · DETROIT CONTROLS · KEWANEE BOILERS · ROSS EXCHANGERS

For information concerning American Blower or Canadian Sirocco power plant equipment, please call the nearest Branch Office or Sales Representative. They are strategically located for your convenience in the cities listed below.

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Atlanta, Georgia
Baltimore, Maryland
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Boston, Massachusetts
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Charleston, West Virginia
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Cleveland, Ohio
Columbus, Ohio
Dallas, Texas
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Denver, Colorado
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Serving home and industry

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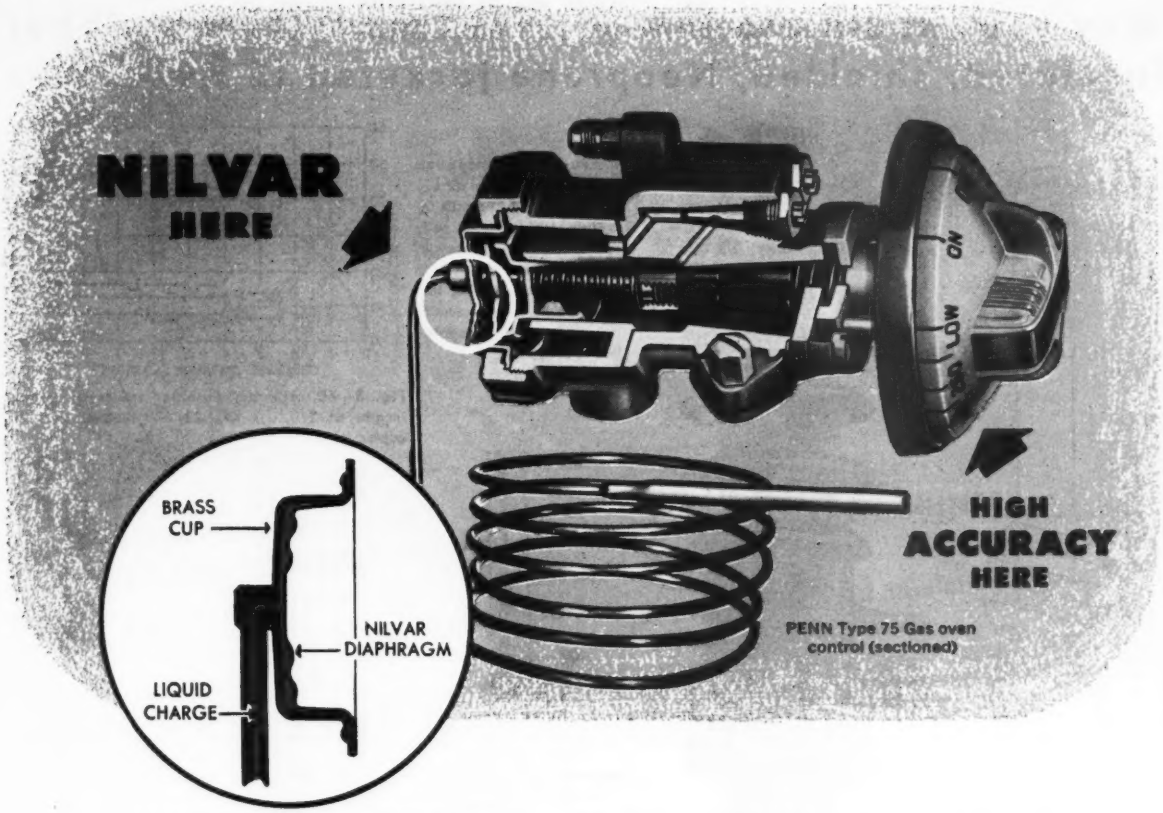


Nilvar* Alloy Makes New PENN Gas Oven Controls Self Compensating

By providing a self-compensating flexible diaphragm assembly for its liquid expansion controls, PENN Controls, Inc. compensates for ambient heat and eliminates control time-lag. Result: controls *accurately* maintain the temperature dialed.

The PENN Self-compensated Diaphragm assembly utilizes a brass retaining cup and a flexible Nilvar diaphragm to form a hollow chamber. This connects to the temperature bulb through a capillary tube, the entire unit being filled with a liquid charge.

Because brass expands much more than Nilvar, ambient heat *simultaneously* increases the volume of the chamber, when it increases the volume of the liquid charge. This self compensation reduces the effect of ambient heat on the diaphragm to zero and permits the diaphragm to respond *only* to bulb temperatures.

PENN specifies Nilvar for this application because it has a very low temperature coefficient of expansion — as low as .000001/C°— lowest of any alloy, and comparable to that of quartz. And its consistent uniformity helps maintain the high accuracy which PENN production standards require.

The remarkable dimensional stability of Nilvar may answer your engineering problems too. Why not talk it over with us. We'll be glad to make recommendations geared to your specific needs.

*T. M. Reg. U. S. Pat. Off.

Nilvar is produced only by

Driver-Harris Company

HARRISON, NEW JERSEY

BRANCHES: Chicago, Detroit, Cleveland, Los Angeles, San Francisco

In Canada: The B. GREENING WIRE COMPANY, Ltd., Hamilton, Ontario.

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

Why you should use G&W POTHEADS on rubber insulated, shielded, Neoprene jacketed 15 Kv. cables

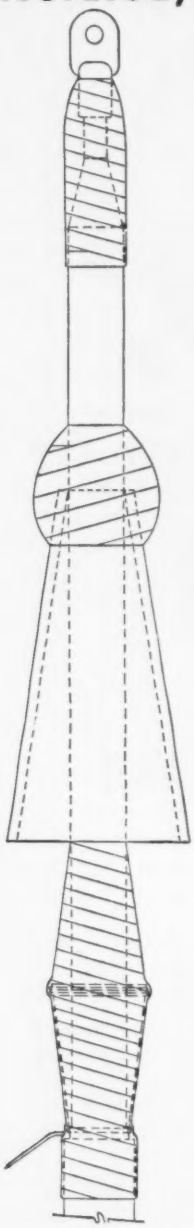


Fig. 1—Cable termination. Exposed insulation subject to deterioration by weather.

Fig. 2—Pothead No. T17231. Permanent protection for cable ends.

Increasing the creepage length on a cable in air beyond a certain distance increases the flashover very little—because ionization of the air (corona) begins at the grounded shielding terminus at the same potential (for a given cable) regardless of the length.

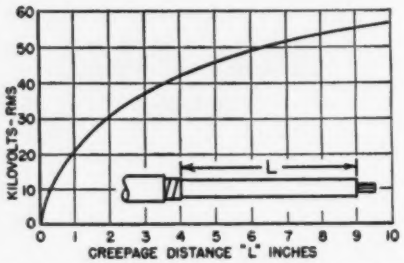


Fig. 3—60 cycle dry flashover values of various lengths of 2/0, 15 Kv., 22/64" rubber insulated cables IN AIR.

Equipotential lines—
A—B—C—D

Flux lines—
X—Y—Z

Fig. 4—Without stress relief cone. High electrical stresses at grounded shielding may cause insulation failure.

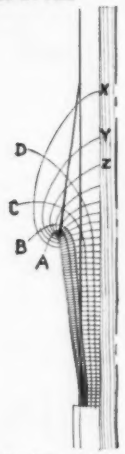


Fig. 5—Stress relief cone decreases radial electrical stresses in the cable' insulation but has little influence on longitudinal stresses.

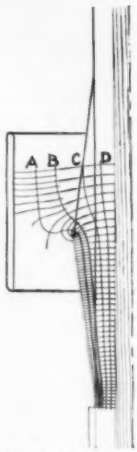


Fig. 6—Further decrease in concentration of flux lines and increase in electrical strength is provided by proper location of grounded pothead body.

A. Exposed insulation surfaces become coated with contaminating dust and in coastal zones salt condensation – which become conducting when wet. As the conducting surface dries unevenly, excessive voltage gradients develop over small areas – arcing can occur and carbonize the organic insulation of a cable termination and result in dielectric breakdown. Inorganic porcelain as used in a pothead is not so affected.

B. The principal benefit of the stress relief cone is in the improved strength of the installation due to an increased resistance to puncture of cable insulation at the grounded shielding terminus where the stress is greatest.

C. Cable surface flashover is increased by the use of insulating compound which has a high dielectric strength compared to air. A pothead provides a container for compound and the compound permits a considerable reduction in the length of the installation.

D. The pothead porcelain provides an outer surface of relatively large diameter compared with the cable, thus reducing the external voltage stresses.

E. High external creepage distance for a given length of porcelain is provided by petticoats which improve the wet flashover characteristics.

F. Potheads (porcelain insulated, compound filled, hermetically sealed) properly protect cable ends against the contaminating effects of weather. G&W potheads meet established A. I. E. E. standards of 60 cycle and impulse voltage withstand values. The extra cost of a pothead (fig. 2) over the cost of materials required for a cable termination (fig. 1) is relatively small – compared with direct and intangible losses resulting from service interruptions due to failures of improperly protected cable ends.

Bulletin AB51 lists potheads with stuffing box seal for Neoprene jacketed cables.

Bulletin A52 gives data on stress relief cones for potheads.

Send for these bulletins.

G & W ELECTRIC SPECIALTY CO., 7780 DANTE AVENUE, CHICAGO 19, ILLINOIS, U. S. A.

THIS OIL PURIFIER HAS ASTONISHING DAILY CAPACITY!

SPECIAL FEATURE OF THE DE LAVAL PORTABLE OUTFIT	WHAT THIS MEANS TO THE POWER ENGINEER
✓ Purifier dehydrates the oil in a single pass	✓ Reduces cost of insulating oil purification

Constant high purifying efficiency–no shutdowns for cleaning or for renewal of parts during run ✓

Dehydrates at a single pass–no re-running

Higher daily capacity of insulating oil saves maintenance costs ✓

Heater cannot carbonize the insulating oil

Safest–continuous discharge of water prevents re-contamination of the insulating oil ✓

Centrifugal purifier is economical to operate

Removes free water without aid of filter press; press used only to remove colloidal carbon ✓

Low temperature purification; high dielectric value of oil maintained longer

De Laval Insulating Oil Purifiers restore the dielectric strength with one pass through the centrifuge bowl. Because no rerunning is necessary, and because the centrifuge does ***all*** of the actual work of dehydrating the oil, daily runs can be exceptionally long . . . hence very economical. (A blotter press is furnished only to remove colloidal carbon from circuit breaker oil.)

Among all of the advantages of De Laval purification listed at the left, none is more important than that of ***safety***. Water removed by a De Laval centrifuge is continuously discharged to waste, so can never suddenly and unnoticed recontaminate the oil and reduce it from a high to a low dielectric.

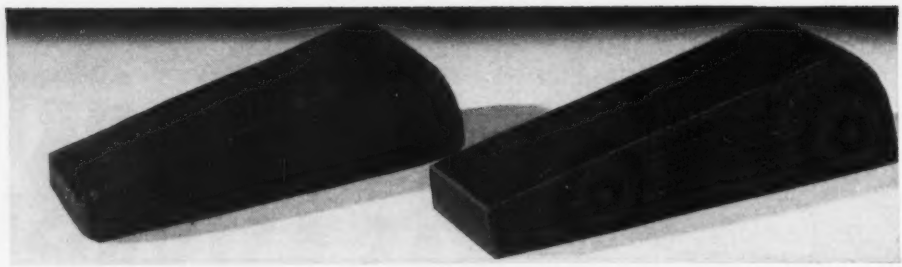
Send for complete details.

✓ CHECK THESE DE LAVAL SUPERIORITIES

THE DE LAVAL SEPARATOR COMPANY
Chicago POUGHKEEPSIE, N.Y. San Francisco

DE LAVAL

INSULATING OIL PURIFIERS

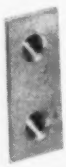


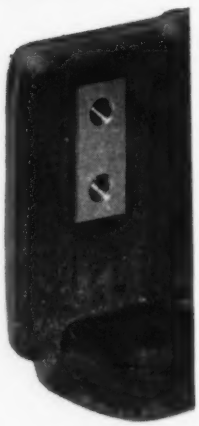
These parallel plugs, used in textile looms, have high impact strength . . . are impervious to oil and water. Will not fracture, chip, delaminate. The plug on left was used for two years! Plugs were made from a canvas-based laminated plastic, strip-molded and cut by C-D-F.

C-D-F Industrial Molded Products

The flexible coupling (left) is made from Celoron molded macerated plastic. Outside surface is smooth, every tooth is capable of carrying heavy loads. Besides its great strength, the coupling is lightweight, smooth and quiet in operation. Coupling material is low cost, resists repeated impacts; is not significantly affected by high temperatures up to 225° F. and is resistant to oil, water, gasoline, many chemicals.

Note brass insert in this molded piece. This is part of an electrical switch component where C-D-F molding techniques built metal into plastic.

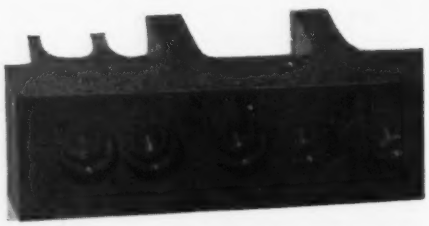




All of these rugged products were cooperatively engineered and manufactured by C-D-F. Most were made from tough canvas sheets treated with phenolic resin, then laminated or macerated, and molded under heat and pressure . . . finished to close tolerances. All have high impact strength, excellent resistance to heat, oil and water, many chemicals.

C-D-F pioneered in molded industrial plastics, developed the famous Celoron timing gears for the automotive industry. Because of its long experience, C-D-F is called upon to work closely with the engineering staffs of America's largest companies. C-D-F has both the men and equipment to handle "big run" molding requirements.

C-D-F wants to work with you. Start by calling a C-D-F sales engineer (offices in principal cities), or write Industrial Molded Products Division, C-D-F, Newark, Delaware.

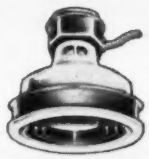


Here's a sample of the fine detail, finish, smoothness you can get with a C-D-F molded job. Edges and holes are clean cut, with a minimum of flash removal required.

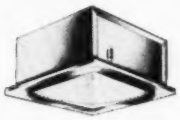
Still another C-D-F low cost molded product . . . made from macerated paper and phenolic resins. It's a "pot-eye" for the textile bleaching industry . . . cloth is run through the ring at high speed. Smooth, strong, never corrodes, withstands high heat and moisture and is very abrasive resistant.

THE NAME TO REMEMBER . . . CDF INDUSTRIAL MOLDED PRODUCTS

Continental-Diamond Fibre Company **NEWARK 15, DELAWARE**

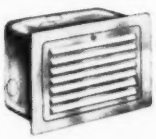


DERBY DOWNLIGHTS—Endless applications. 7″ diameter recessing downlights, available with matt black removable louver or with Holophane Controlens*. UL approved.

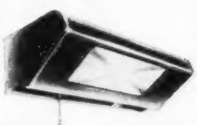


DUO-FRAME UNITS—Recessing units with Holophane, Corning, and Phoenix glassware. Two-piece frame. Drop hinges. Vertical and horizontal lamp mounting units. UL approved.

EXIT SIGNS—Surface, recessing, top and end mounting units. Metal stencil sign faces, backed by red glass. HOT-BONDED lustre aluminum finish. UL approved.



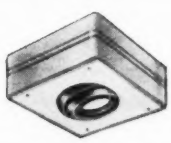
NITE LITE—One-piece, die-drawn recessing box. Louvered face with concealed hinge for easy servicing. Stainless steel or baked lustre aluminum finish. UL approved.



BED LAMP—Direct-indirect hospital unit. For three 50/60 watt lamps. Stainless steel finish. Controlens* panel in bottom, diffusing glass in top. UL approved.

PLEXOLINE® ACCENT UNITS—For use singly or with PLEXOLINE linear units. Adjustable and fixed units. Louvered body provides spill light on sides. UL approved.

TROFFER ACCENT UNITS—Self-contained square recessing units, adjustable or fixed, flange or snap-in type. May be used singly, within or at end of troffer runs. UL approved.



SURFACE MOUNTED ACCENT UNITS—Adjustable units or fixed units with Holophane Controlens*. May be used singly or with VIZ-AID® or LENOX® fixtures. UL approved.

RECESSING CORRIDOR UNITS—Available with two optical characteristics: asymmetric and symmetric. Flange or snap-in. Holophane* prismatic glass globe. UL approved.

*®HOLOPHANE CO., INC.

A complete line of incandescent units by Day-Brite

When the name "Day-Brite" is mentioned, you think of the nation's finest line of fluorescent fixtures. This is to remind you that there's an equally fine line of Day-Brite incandescent units—giving you the advantages of Day-Brite quality and design for every piece of equipment called for in any type of lighting job. Write for full descriptive product information on the Day-Brite incandescent line. You'll find it a valuable addition to your files.

"DECIDEDLY BETTER"
DAY-BRITE
Lighting Fixtures

Day-Brite Lighting, Inc., 5417 Bulwer Ave., St. Louis 7, Mo.

In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario

379

Indicated in red are short lengths of BH "649" as used in a telephone Circuit, Line Jack, part of a Manual Telephone Switchboard by Signal Corps Engineering Laboratories.

½¢ *lengths* of BH "649" help shrink a telephone

New Army field telephones manufactured by Federal Telephone & Radio Corporation are only one-third the size of previous equipment. "Electrical insulation that withstands high and low temperatures, and vibration is a must in this application. BH "649" vinyl coated Fiberglas Tubing meets all specifications", say Federal engineers.

Resistance to high and low temperatures is a permanent feature of BH "649". It keeps its flexibility and dielectric strength from –50°F. to 266°F. Remains unchanged during processing temperatures up to 500°F.

Vibration and shock resistance are additional advantages of BH "649". It is permanently flexible with infinite shelf-life. Can be knotted, twisted and given a sharp bend without cracking. It helps speed assembly, too.

Rated up to 7,000 volts, BH "649" has excellent chemical and oil resistance. Also available with fungus inhibitors.

BH "649" is just one of a large family of tubings and sleevings that have solved many electrical insulation problems. If you'll send facts on your requirements — voltages — temperatures — unusual conditions — we'll make recommendations and send you samples for testing.

Address Dept. W-8
Bentley, Harris Manufacturing Co.
Conshohocken, Pa.

BH FIRST IN
use of Fiberglas
heat-treated Fiberglas
true high temperature flexibility
vinyl-coated Fiberglas
silicone rubber coating
colors in silicone rubber
true Class B (130°C.) protection

BH *Fiberglas** SLEEVINGS

*BH Non-Fraying Fiberglas Sleevings are made by an exclusive Bentley, Harris process (U. S. Pat. No. 2393530). "Fiberglas" is Reg. TM of Owens-Corning Fiberglas Corp.

Rely on Quality

INDUSTRIAL

PYLE-NATIONAL LIGHTING FIXTURES

for longer service life, added Safety and Efficiency

EXPLOSION-PROOF

Pyle-National LE Series (Class 1, Groups C and D)

For use in locations where highly flammable materials are manufactured or handled.

Rugged, flame-tight cast aluminum alloy housings render internal explosions harmless, and insure safe operating temperatures. Threaded construction permits easy access to interior for wiring and lamp replacement. Available in many types and sizes.

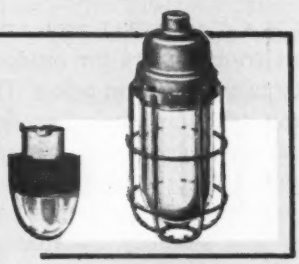
DUST-TIGHT

Pyle-National DE Series (Class II, Group E, F, G and Class III)

For use in locations where flammable dusts are present in quantity.

Strong, one-piece cast aluminum alloy housings are designed to exclude dust from the interior and to avoid accumulation of dust on the exterior surface. Available in many types and sizes.

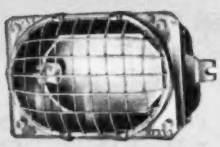
VAPOR-TIGHT



Pyle-National BO Series and Signal or Pilot Lights

For use in any outdoor or indoor location subjected to heavy concentration of non-flammable vapors, gases, dusts, or moisture.

Heavy-duty construction with efficient sealing features insures exceptionally long-life service. Full line for 10 to 200 watt lamps.

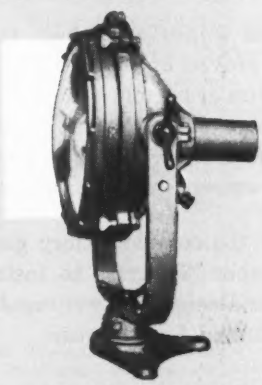


VAPOR-TIGHT PIT FLOODLIGHT

Especially designed for recessed or surface mounting in walls or ceilings of pits, subways, or other locations where heavy moisture prevails. Reflector can be pivoted to adjust the angle of beam. Front glass is heat and impact resisting. Water drainage slots on cover.

WEATHER-PROOF ENCLOSED FLOODLIGHTS

Sealed against moisture and dirt. Constructed throughout of cast aluminum and other corrosion-proof materials. Floodlights retain their original high efficiency output throughout an exceptionally long-service life with negligible maintenance and replacement expense.



SINCE 1897

THE PYLE-NATIONAL COMPANY

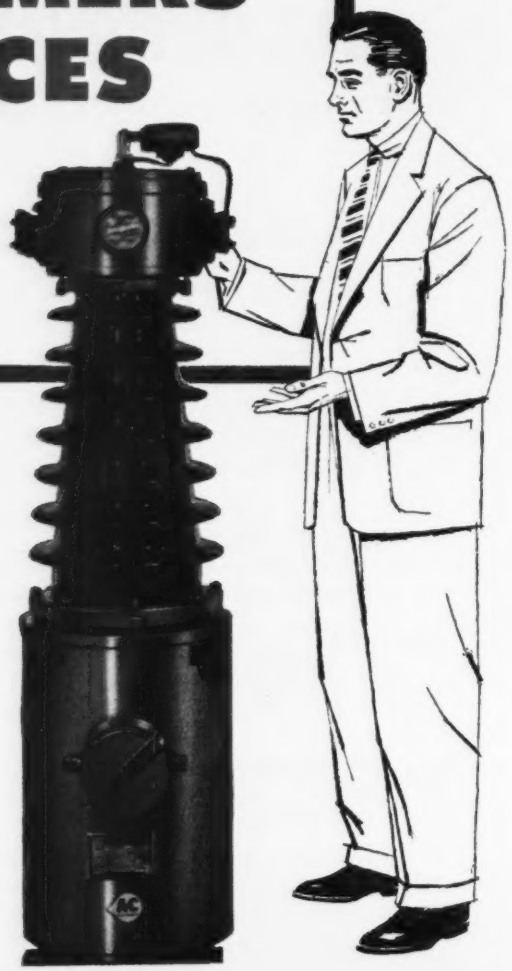
1385 N. KOSTNER AVENUE • CHICAGO 51, ILLINOIS

District Office and Representatives in Principal Cities of the United States. Export Department: International Railways Supply Co., 30 Church St., New York. Canadian Agent: The Holden Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver.

CONDUIT FITTINGS • PLUGS AND RECEPTACLES • TURBO-GENERATORS • GYRALITES • MULTI-VENT AIR DISTRIBUTION

ALLIS-CHALMERS INTRODUCES

New Line of Outdoor Current Transformers



Featuring:

- ★ **Weight Reductions Up to 54% Compared With Previous Designs**
- ★ **High Thermal Rating**
- ★ **Increased Mechanical Strength**
- ★ **Corona-Free Design for Long Insulation Life**

HERE IS A COMPLETELY NEW LINE of current transformers for outdoor use on power circuits 69 kv and below. They bring you many advances, including design features that result in excellent performance, high thermal and mechanical strength, improved insulation life, and mechanical advantages that simplify installation.

Most important, their ruggedness has been proved by exhaustive tests. Temperature rise at normal current is low, allowing ample overcurrent in emergencies. The transformers are rated 65 times normal primary current under short circuit conditions.

For the complete story get your copy of the paper "Progress in Instrument Transformer Design" by writing Allis-Chalmers, Milwaukee 1, Wisconsin. A-4109

LESS WEIGHT — LESS FLOOR SPACE
Compare New Type SCW with Previous Design

Kv	Design	Height	Floor Space	Gal. Oil	Weight (lbs.)
25	New Type SCW	42"	14" x 19"	9	230
	Previous Type	33"	22" x 22"	15	490
34.5	New Type SCW	45"	14" x 19"	9½	230
	Previous Type	33"	22" x 22"	15	490
46	New Type SCW	55"	16" x 23"	16	475
	Previous Type	40½"	23" x 23"	18½	500
69	New Type SCW	61"	16" x 23"	18	525
	Previous Type	46½"	28½" x 28½"	35	1000

ALLIS-CHALMERS

BENJAMIN

Versatile "Magna-Flo" SYSTEMS

go to any length to fit your lighting requirements!

Yes, ONE fluorescent lighting system for all three lengths of T12 Slimline Lamps! It's Benjamin "Magna-Flo" . . . so easily adapted to any size area, any type of location found in industry. No matter where you want fluorescent light . . . high ceilings or low ceilings, assembly lines or drafting rooms, lighting for inspection or mass production . . . whatever the seeing conditions and requirements of the task, there's a "Magna-Flo" System to fill the need exactly. As shown by the chart below "Magna-Flo" is really complete . . . yet so simple to order and specify, because just three channel sizes and four basic reflectors form the backbone of over 300 different fluorescent lighting systems!

Write for Bulletin AD 5705 for complete specification data on Benjamin "Magna-Flo" . . . see how it goes to any length to suit your fluorescent lighting needs!

"MAGNA-FLO"				
3 BASIC CHANNELS	48"	72"	96"	
4 REFLECTORS	OPEN-END	CLOSED-END	OPEN-END W/APERTURES	CLOSED-END W/APERTURES
3 LENGTHS OF T12 SLIMLINE LAMPS	48"	72"	96"	
2 LAMP HOLDERS	2-LAMP "SPRINGLOX"		3-LAMP "SPRINGLOX"	
2 TYPES OF UNITS	INDIVIDUAL		CONTINUOUS LINES	
4 ACCESSORIES	LOUVERS	PLASTIC COVERS (48" only)	GLASS COVERS (48" only)	SHIELDS
6 TYPES OF SUSPENSION	CHAIN	CONDUIT	CABLE	SINGLE-ROD / CEILING / TWIN-ROD

Sold exclusively through electrical distributors.

A Product of Benjamin Electric Mfg. Co., Dept. K, Des Plaines, Ill., makers of famous Benjamin and Leader Line Lighting Equipment and Sound Signals for Industry, Institutions and Commerce.

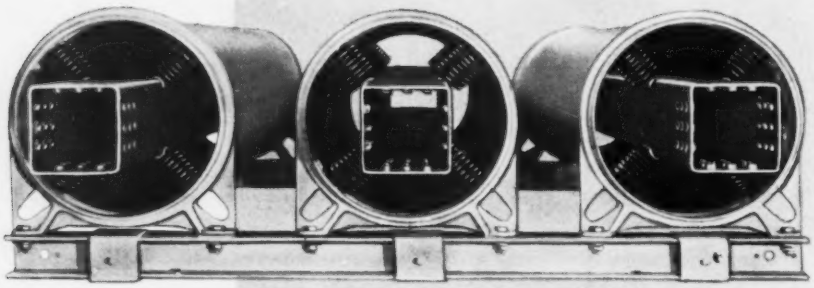
BENJAMIN "Springlox"—the exclusive "easy-in easy-out" lampholder which reduces maintenance costs and re-lamping time with a patented spring design . . . "Springlox" is standard equipment with all "Magna-Flo" units.

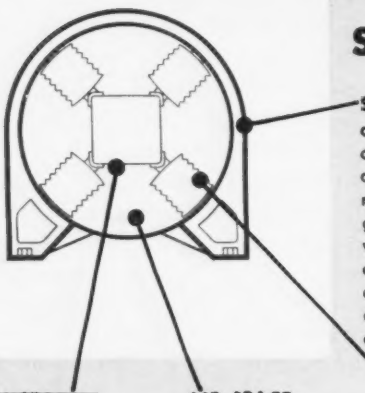
B-297

What Isolated Phase Bus is

Transmitting huge quantities of electrical energy at generated voltage is a job for an especially reliable type of conductor. Generator leads, transformer leads, feeders, and main and transfer buses in generating and distribution stations form key links in the nation's power networks. They must possess high dielectric and mechanical strength.

I-T-E Isolated Phase Bus is designed to meet all these electrical and mechanical essentials. It is a structure of heavy copper conductors, one to a phase, each enclosed in its own grounded metal shield. This basic design characteristic completely eliminates phase-to-phase faults in the most economical way possible.





Simplicity is the keynote

SUPPORTING RINGS of strong cast aluminum connect the light metal cover electrically and mechanically to grounded plant steelwork. Tightly gasketed aluminum covers make a single design suitable for indoor or outdoor use.

CONDUCTORS— one for each phase— are of copper or aluminum in round or square cross-section. Lengths up to twenty-four feet are joined end to end with solid, flexible, or braided connectors.

AIR SPACE insulation is unchanged by heat or age. Because air is free and inexhaustible, it does not have to be replenished or kept under pressure.

INSULATORS are of solid, non-aging porcelain, radially disposed to withstand compression. Insulators cradle conductors to allow free movement when conductors expand or contract.

The construction of I-T-E Isolated Phase Bus is as simple as its neat appearance suggests. Complete phase isolation—the fundamental requirement—is achieved through the arrangement and construction of conductor, insulator, and housing.

Light weight, freedom of movement for conductors, adequate cooling, and other requirements are provided for through use of a few simple parts.

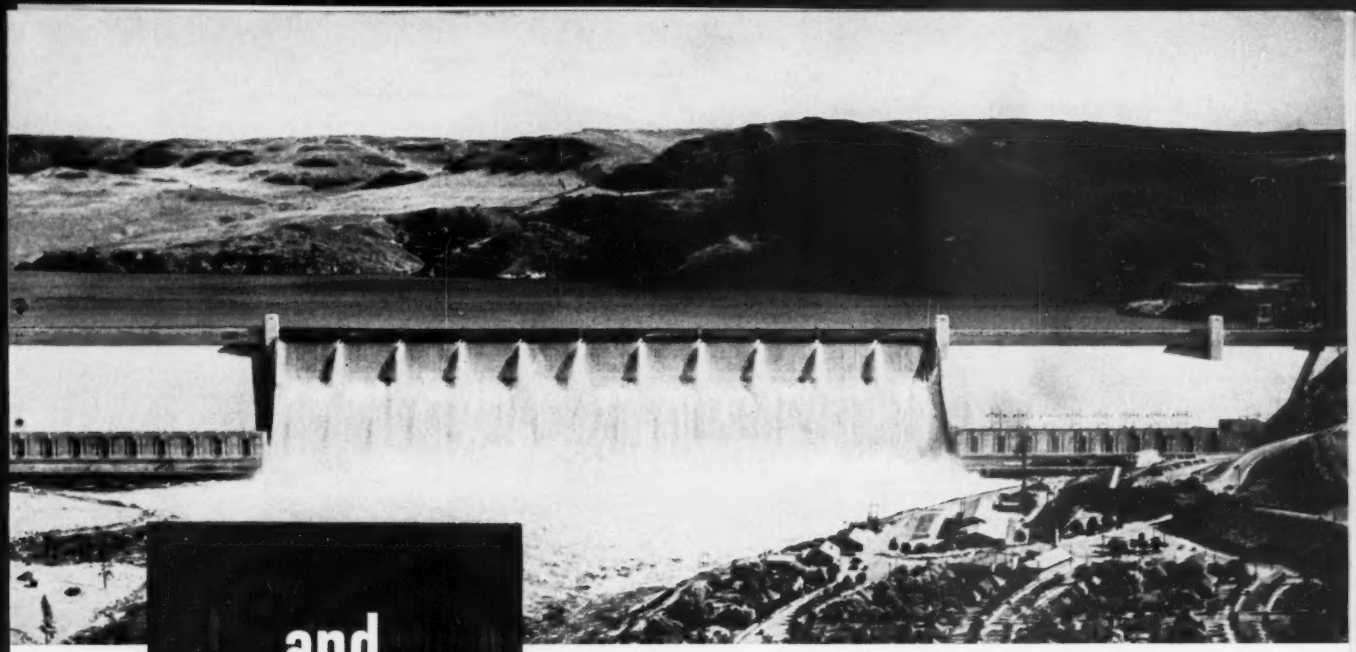
For details, check the I-T-E Application Engineer nearest you.

I-T-E

ISOLATED PHASE BUS

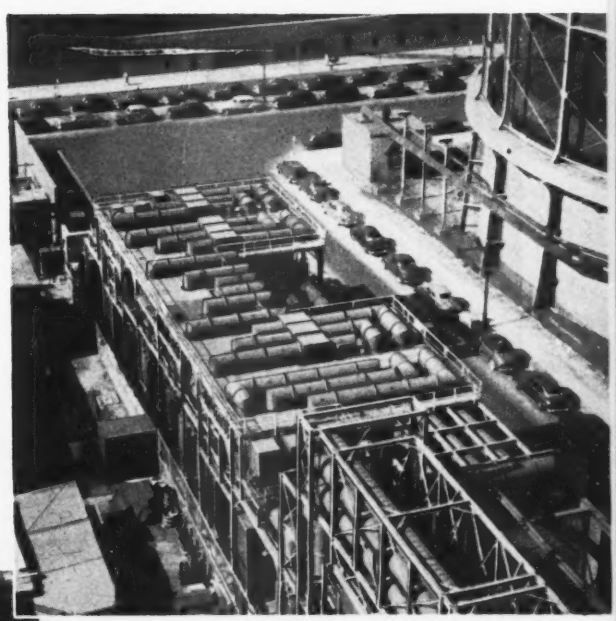
I-T-E CIRCUIT BREAKER CO. • 19th and HAMILTON STS. • PHILA. 30, PA.

R&IE EQUIPMENT DIVISION, GREENSBURG, PA.

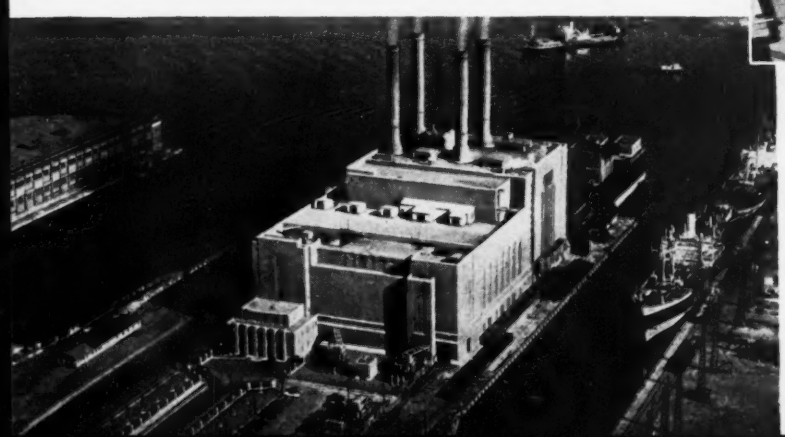


...and where it is used

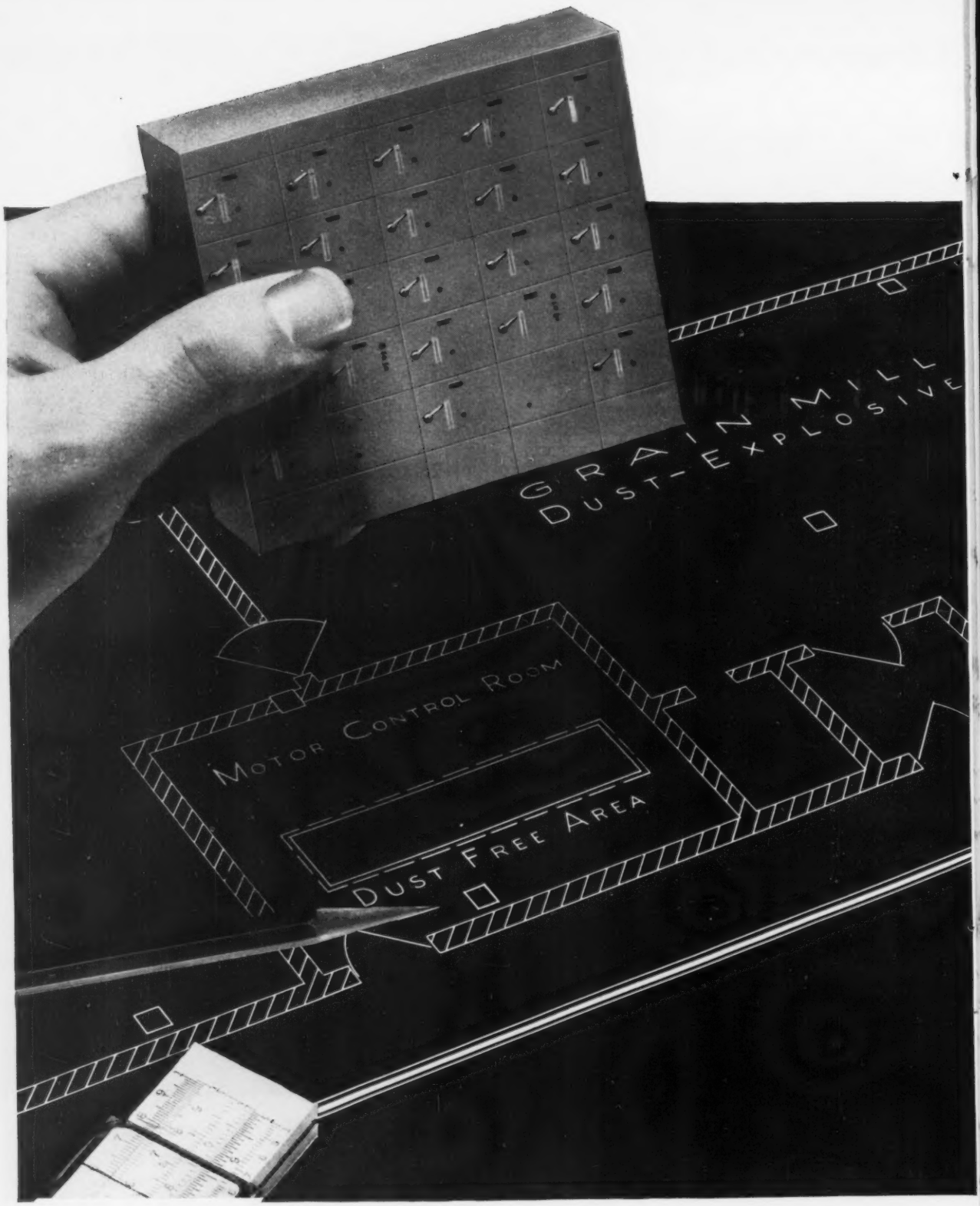
Hydroelectric generators—
including the world's largest waterwheel-driven machines, deliver vast quantities of power through safe I-T-E Isolated Phase Bus runs.



Steam plants—
are being built with larger and larger generators. I-T-E has design experience and production facilities to keep pace with the nation's expected power expansion and with rapid increases in generator output ratings.



Switching stations—
of the most modern types use I-T-E Isolated Phase Bus runs to connect transformers and distribution switchgear. The installation pictured here employs 69-KV bus structures at a utility central station.


GRAIN MILL
DUST-EXPLOSIVE
MOTOR CONTROL ROOM
DUST FREE AREA

For safety under hazardous dust conditions, this plant uses Westinghouse Control Centers

Centrally located in dust-free rooms, standard Westinghouse Control Centers offered this Midwestern grain mill the safest, most economical motor control.

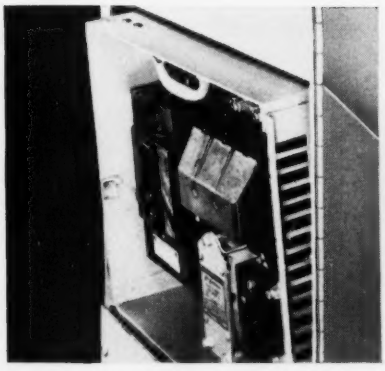
Locating the motor control in danger-free areas, allowed the use of standard control centers rather than more costly explosion-proof control devices for each motor drive. Savings in wiring and installation time resulted, too, because the control centers were factory built at a nearby Westinghouse plant. Completely wired, and tested, they were shipped ready to operate.

Personnel have complete safety when servicing these control centers. The special, tilt-out, lock-out position of the starter assures a dead unit. Placing the starter in service, Magna-Grip stab connectors make quick, positive plug-in with the buses.

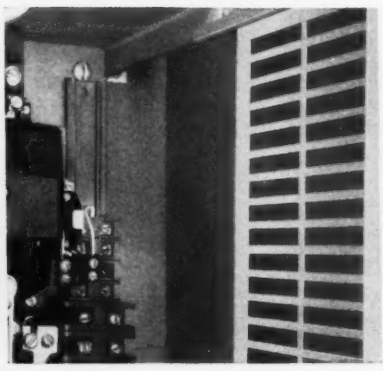
Standard control center interrupting components are tested at the Westinghouse High Power Laboratory to control fault currents up to 25,000 amps for full protection of motor and circuit equipment.

You can see these advantages, too, right on your desk top. Call your local Westinghouse Representative for a demonstration of a scale model Westinghouse Control Center, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-27032

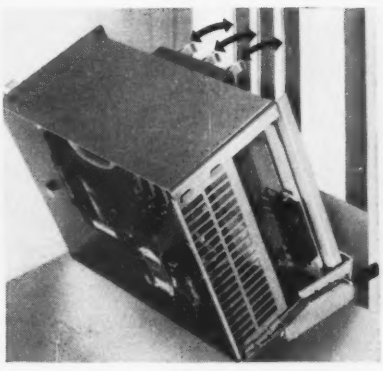
YOU CAN BE SURE...IF IT'S Westinghouse



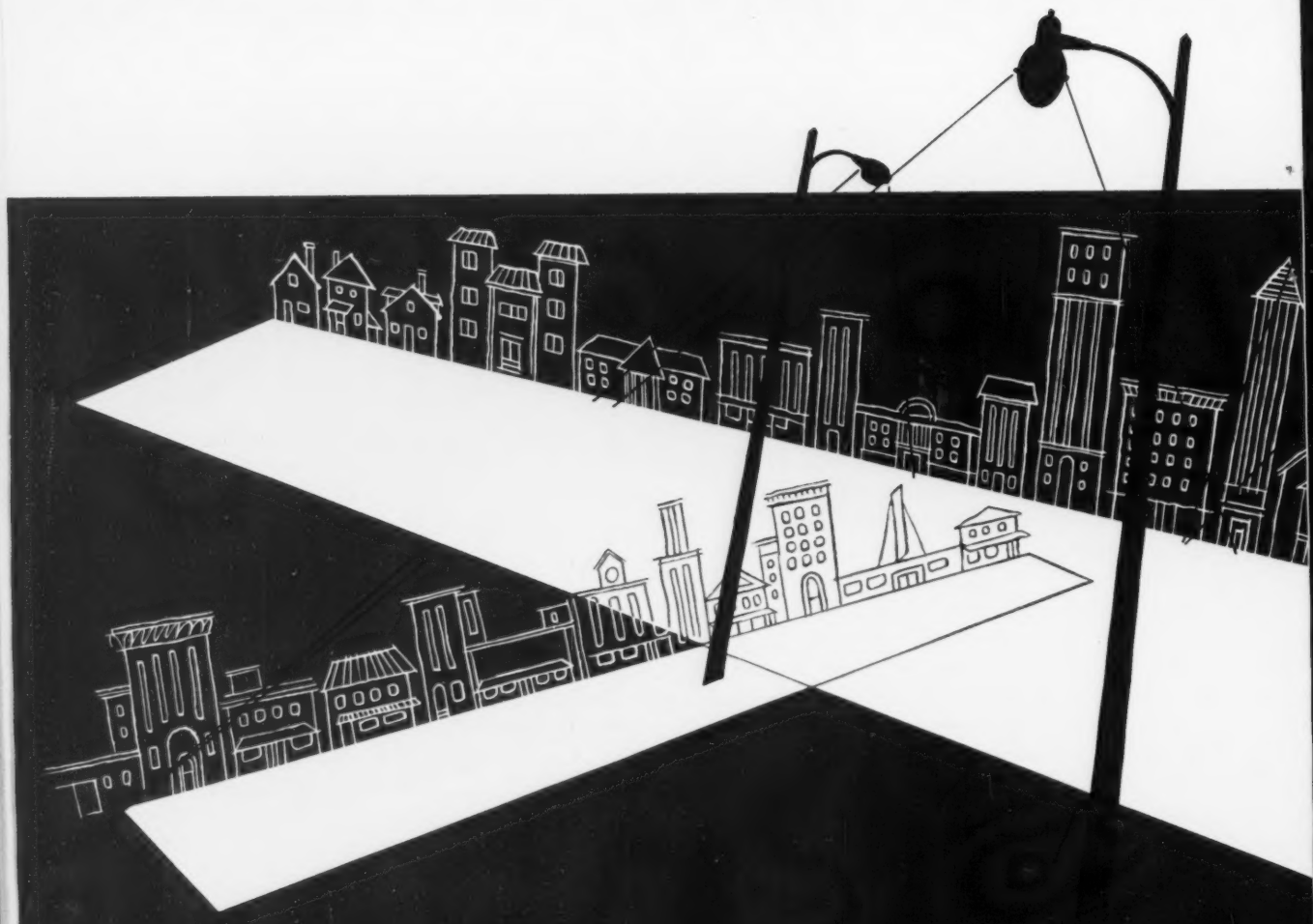
Tilt-Out, Lock-Out position of starter unit permits safe, on-the-panel servicing. Unit pivots forward disengaging stabs from buses. Can be locked in this safe position.



Tested Side Baffles localize any fault within the starter unit. Hot gases resulting from a fault can escape easily but are rendered nonconductive.

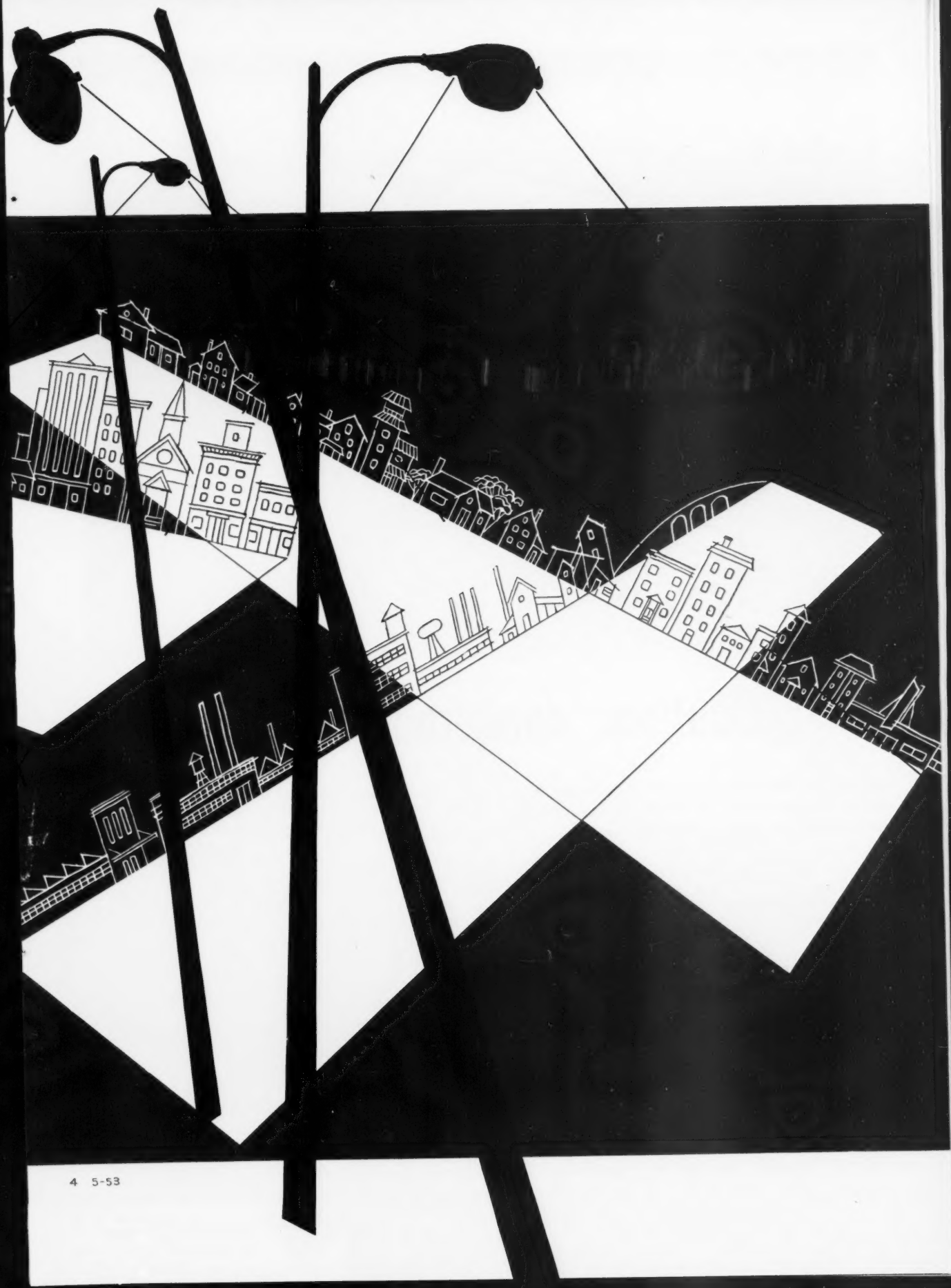


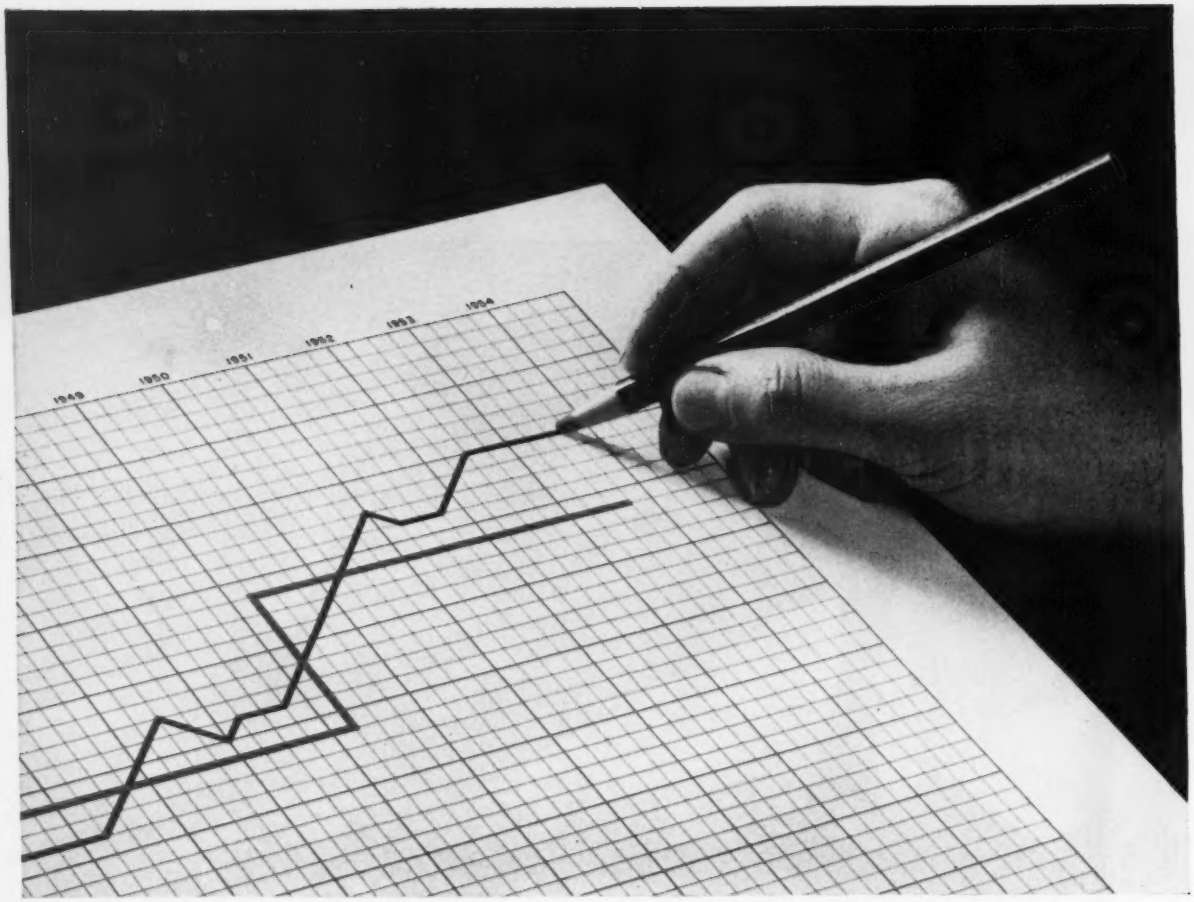
Plug-In Safety, Magna-Grip stab connectors make positive connection with buses. Guide rails assure proper alignment of the unit in the cubicle.



complete street lighting equipment

- Horizontal Mercury Luminaires
- Incandescent Luminaires—*Enclosed and Open*
- Union Metal Poles—*Steel and Aluminum*
- American Concrete Poles
- Pipe Brackets and Mast Arms
- Holophane Refractors
- Street Lighting Glassware
- Control Equipment and Accessories





Caution: dangerous curves

Keeping your fire protection properly balanced with changes in processes as well as ups and downs in production is vital to efficient, profitable operation.

You'll find your best answer to this serious fire problem which is currently confronting industry by installing an expansible, fully approved C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System. Simple piping, running from one centrally located storage tank, instantly transports clean, non-damaging, non-conducting carbon dioxide anywhere in the plant area. Fire at any protected location is extinguished in seconds with an absolute minimum of expense and interruption.

Changes in your fire protection requirements are easily and economically provided for with a C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System by initially installing an oversized storage tank and adding where necessary the supplementary discharge facilities at a later date.

Flexibility is the keynote . . . the low pressure carbon dioxide storage tanks range in capacity from one to fifty tons . . . discharge facilities can be either manual mechanical, manual electric, automatic mechanical, automatic electric or a combination of these . . . especially installed to fit your particular needs.

WHEN BUSINESS STOPS . . . INCOME STOPS!

Don't take chances with your investment. Secure the benefits of highly efficient fire protection engineering today... our extensive experience over the years is at your disposal without obligation. Get the facts now!

C-O-TWO

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers
Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

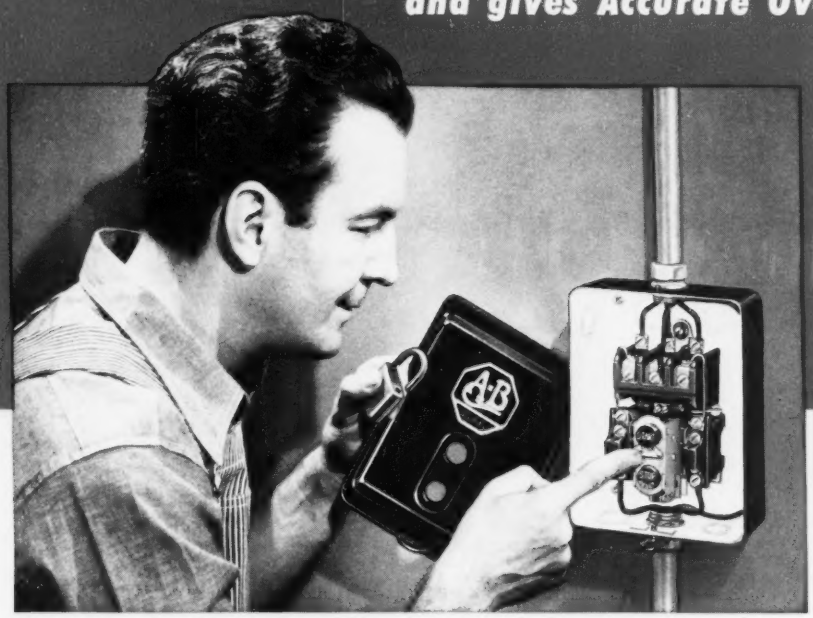
C-O-TWO FIRE EQUIPMENT COMPANY
NEWARK 1 • NEW JERSEY

C-O-TWO FIRE EQUIPMENT OF CANADA, LTD. • TORONTO 8 • ONTARIO

Sales and Service in the Principal Cities of United States and Canada

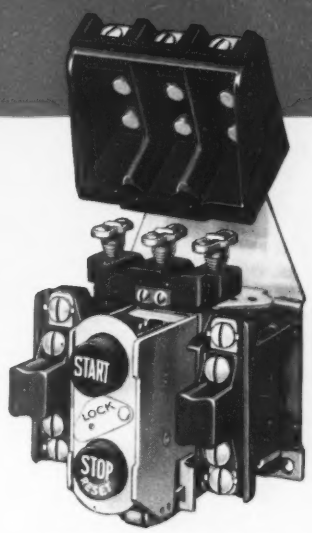
AFFILIATED WITH PYRENE MANUFACTURING COMPANY

A MANUAL MOTOR STARTER
that's Push Button Operated...
and gives Accurate Overload Protection



Maintenance man is locking stop button in OFF position before padlocking cabinet cover. All Bulletin 609 Manual Starters have this safety first feature. It protects man, motor, and machine.

For Single and 3 Phase Motors up to 5 hp, 220 v; 7½ hp, 440-550 v



Bulletin 609 Switch with arc hood raised to show three double break, silver alloy contacts.

Bulletin 609 Starters have a quick make, quick break switch mechanism that is actuated manually with two push buttons. Two accurate overload breakers automatically open the switch in case of sustained overload.

The double break, silver alloy contacts require no cleaning, filing, or dressing. Bonderized pressed steel cabinets resist rust under ordinary plant conditions. For damp or dusty places the special cabinets, shown below, assure long, trouble free life. Millions of Bulletin 609's are in daily use. Write for bulletin.

5-53-M

Available in enclosures for every type of service

Allen-Bradley Co.
1316 S. Second Street
Milwaukee 4, Wis.

A-B Quality

ALLEN-BRADLEY

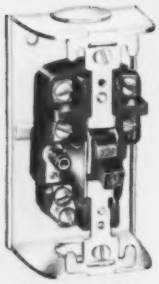
BULLETIN 609 MANUAL MOTOR STARTERS

QUALITY

Standard toggle lever switch

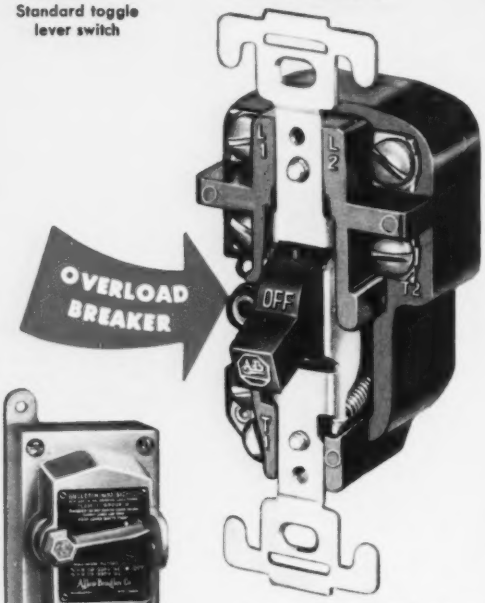
Key operated for added safety

Linkage lever switch



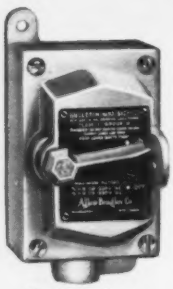
Form 51-52 with cover off

Form 51-52 with pilot light



Close-up of Bulletin 600 switch mechanism, showing thermal overload breaker. These switches are available with one or two poles.

In watertight enclosure



For hazardous gas locations

Fits flush switch box

Fits handy switch box

A BIG LINE OF SMALL STARTING SWITCHES

with Overload Protection for Motors up to 1 hp

The Bulletin 600 Starting Switch gives overload protection to small a-c and d-c motors on unit heaters, stokers, fans, compressors, and small electric tools. It is a popular and fast selling starting switch.

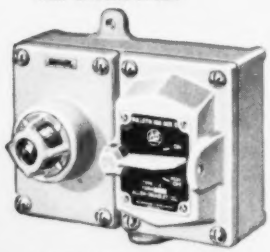
The overload breaker automatically trips the switch in case of sustained overload. The switch cannot be held closed until the overload on the motor is cleared.

To reset the overload breaker, the switch lever is moved to OFF position. The motor can then be restarted by moving the switch lever to the ON position. Therefore, no time is wasted replacing fuses.

Bulletin 600 Starting Switches are available in many forms of enclosures, a few of which are shown above. For complete data please send for illustrated Bulletin 600, today.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

Form 72 unit with selector switch



Form 62 watertight enclosure with pilot light

ALLEN-BRADLEY

BULLETIN 600 STARTING SWITCHES

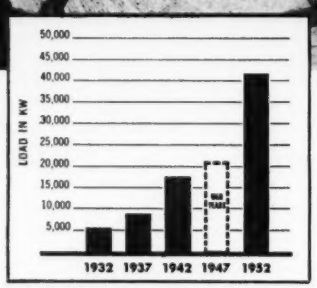
QUALITY

A-B Quality

5-53-M

SHOULD YOU GET A LINE ON COMMERCIAL COOKING LOAD?

Here's the dollars—and sense—answer from M. E. Skinner, Vice President, Union Electric Company of St. Louis.



Union Electric's Commercial Cooking load has doubled in volume every five years since 1932.

"WHEN you can get an extra million dollars in annual revenue from two full-time Commercial Cooking Specialists—as we have—the answer is obviously 'Yes'," says Union Electric Vice President M. E. Skinner.

"Our commercial cooking load has more than doubled itself every five years for the last two decades—even in the early days when electric acceptance was low and the food service market was quite small. But those 'pioneer' years are long gone; since World War II the picture has changed radically—

... today the food service industry is a booming 12-billion-dollar-a-year business (America's fourth largest!);

... even more important, electricity has become the preferred 'fuel' wherever its advantages for commercial cooking have been aggressively promoted by local utilities;

... the advantages of modern electric cooking are now easily proved to your customers through the wide variety of time-tested, successful promotional programs available today;

... finally, commercial cooking load has uniquely superior characteristics that bring a higher dollar return for the effort invested.

"Here at Union Electric we sincerely believe that commercial cooking promotion now offers a bigger opportunity than ever for utilities seeking to get a line on profitable new sources of revenue."

"WE ADDED JUST TWO MEN TO OUR STAFF... AND NEARLY 50,000 KW'S TO OUR LOAD..."

says Shelley Sansbury
Manager of Market Development

"Promoting commercial cooking has brought us big revenue for comparatively little effort.

"Electric equipment is now easy to sell, for this amazing 'fuel' has brought the same clear-cut superiority to commercial cooking equipment that it has to such other fields as refrigeration and air conditioning.

"The award-winning model kitchen in our own employee cafeteria is one of our best salesmen. Prospects who see it while attending our annual 'Food Service Festival' or our regular Thursday sessions with food service men are tremendously impressed with its efficiency and showmanship.

"Industrial and Commercial Sales Managers Carter Lewis and Paul McCormick maintain a vital interest in commercial cooking and key their operations closely to such major activities as the 'Restaurant Roundup,' co-sponsored by Union Electric and Hotpoint Company."

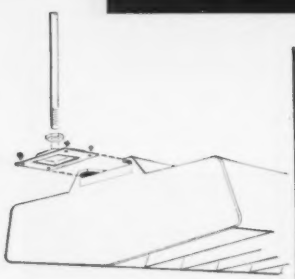
★ ★ ★

If your company is interested in capitalizing on this important new load building trend, you are invited to share our commercial cooking services, facilities and programs with the scores of utilities who have profitably preceded you in the field.

Orin E. Wolf
Vice President
Hotpoint Co.
Commercial Equipment Department
227 South Seeley Avenue
Chicago 12, Illinois

Hotpoint ALL-ELECTRIC Commercial Cooking
HOTPOINT CO. A DIVISION OF GENERAL ELECTRIC COMPANY

Performance Exceeds Requirements of
American Standard Practice for School Lighting



Sliding stem plate can be moved from end to end to support the Cavalier at any point, completely eliminating problems of in-line spacing of mounting points.

For the complete story of this beautiful new streamlined direct-indirect luminaire, write for an 8-page 3-color folder. The F. W. Wakefield Brass Company, Vermilion, Ohio. In Canada, Wakefield Lighting, Ltd., London, Ontario.

Note that the brightness readings for the new Cavalier are well below the recommended maximums:

Zone	The Cavalier	Max. Recommended with Proper Refl.
60°–90°	100 ft.-L	450 ft.-L
45°–60°	250 ft.-L	900 ft.-L
0°–45°	1800 ft.-L	2000 ft.-L

Several important new design features are responsible for such excellent performances:

FIRST, the full length luminous plastic side panels have no opaque metal framing, but are supported internally by a steel frame. This frame is also an internal reflector, a feature which keeps side panel brightness down to a pleasant 100 ft-L.

SECOND, the louvers provide complete 45° x 45° shielding, or shielding at 45° x 25°. There is no view of lamp at specified shielding angles through the entire viewing cone.

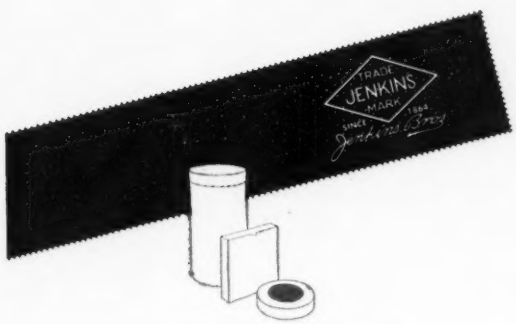
THIRD, a special Wakefield low-brightness finish on louvers, side reflectors, panels and channels serves to keep brightness low.

Here then is an excellent new direct-indirect luminaire for your consideration when planning classroom lighting. There are two models, both equipped for Rapid Start or Slimline lamps, the Cavalier II (two lamps) and the Cavalier IV (four lamps).

Wakefield **Over-ALL Lighting**

lasting "tack"

When the weather's cold and wet,
Gold Seal Tape sticks to the job.
Sticks when it's hot, too . . . won't smear
or dry out. A few wraps, and the job's finished . . .
one thickness insulates. Try it.
See how it saves time and trouble . . .
see why it's the
electrical worker's favorite.
Jenkins Bros. (Rubber Division),
100 Park Ave., New York 17.



FRICTION AND RUBBER TAPES
In 10-roll cartons or single rolls.
Every roll sealed in cellophane, stays fresh.

JENKINS

Gold Seal Tape

Jenkins Bros. also make
Diamond Seal Friction and Rubber Tapes
which meet ASTM Specifications.

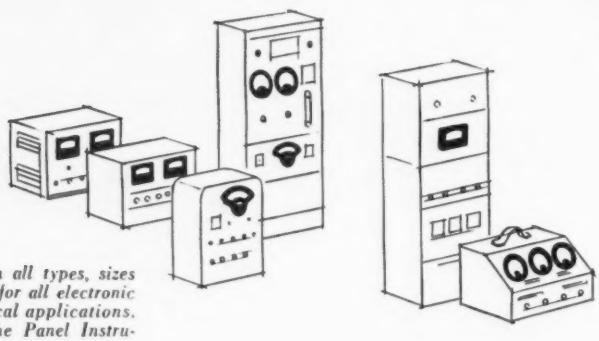
A PRODUCT OF JENKINS BROS....

MAKERS OF FAMOUS JENKINS VALVES

WESTON

PANEL INSTRUMENTS...

...outward evidence of the high quality built within fine electronic equipment



Available in all types, sizes and ranges for all electronic and electrical applications. Send for the Panel Instrument bulletin.

WESTON ELECTRICAL INSTRUMENT CORPORATION, 614 Frelinghuysen Avenue, Newark 5, N. J.

ON THE HIGH VOLTAGE HORIZON

The TTR49 AIR SWITCH

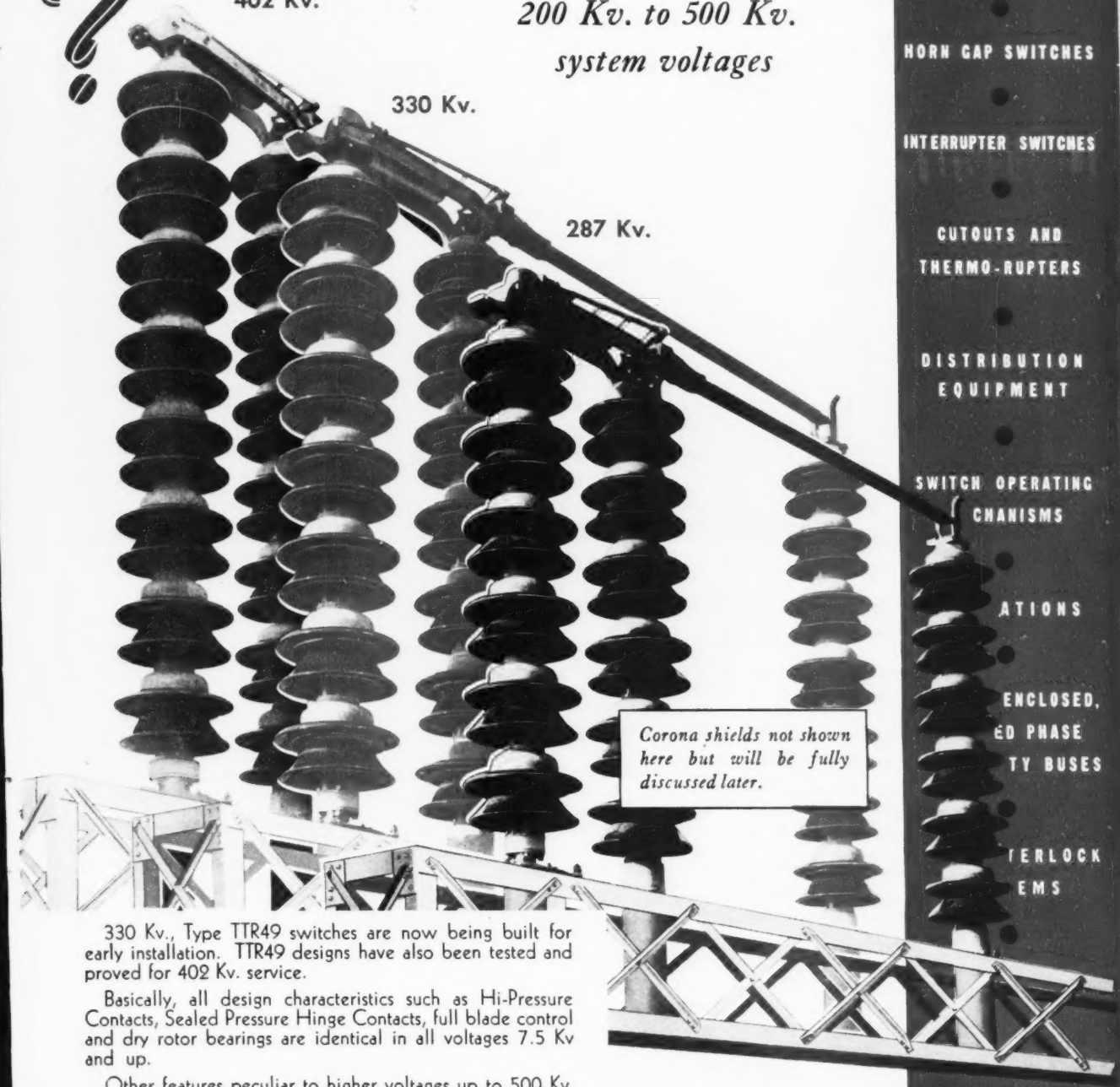
500 Kv.

402 Kv.

330 Kv.

287 Kv.

sets the pace for your future system for 200 Kv. to 500 Kv. system voltages



Corona shields not shown here but will be fully discussed later.

330 Kv., Type TTR49 switches are now being built for early installation. TTR49 designs have also been tested and proved for 402 Kv. service.

Basically, all design characteristics such as Hi-Pressure Contacts, Sealed Pressure Hinge Contacts, full blade control and dry rotor bearings are identical in all voltages 7.5 Kv and up.

Other features peculiar to higher voltages up to 500 Kv, such as high momentary values in jaw and hinge contacts, corona shielding, break distances, blade construction and balance, and interphase operating connections have been designed and tested for the ultra high voltages of the future.

R&IE

R&IE SWITCHING EQUIPMENT

DIVISION OF I-T-E CIRCUIT BREAKER CO., GREENSBURG, PA.

The Check List

CONDUCTOR SUPPORTS, CLAMPS AND FITTINGS

DISCONNECTING SWITCHES
INDOOR AND OUTDOOR

HORN GAP SWITCHES

INTERRUPTER SWITCHES

CUTOUTS AND THERMO-RUPTERS

DISTRIBUTION EQUIPMENT

SWITCH OPERATING CHANISMS

ATIONS

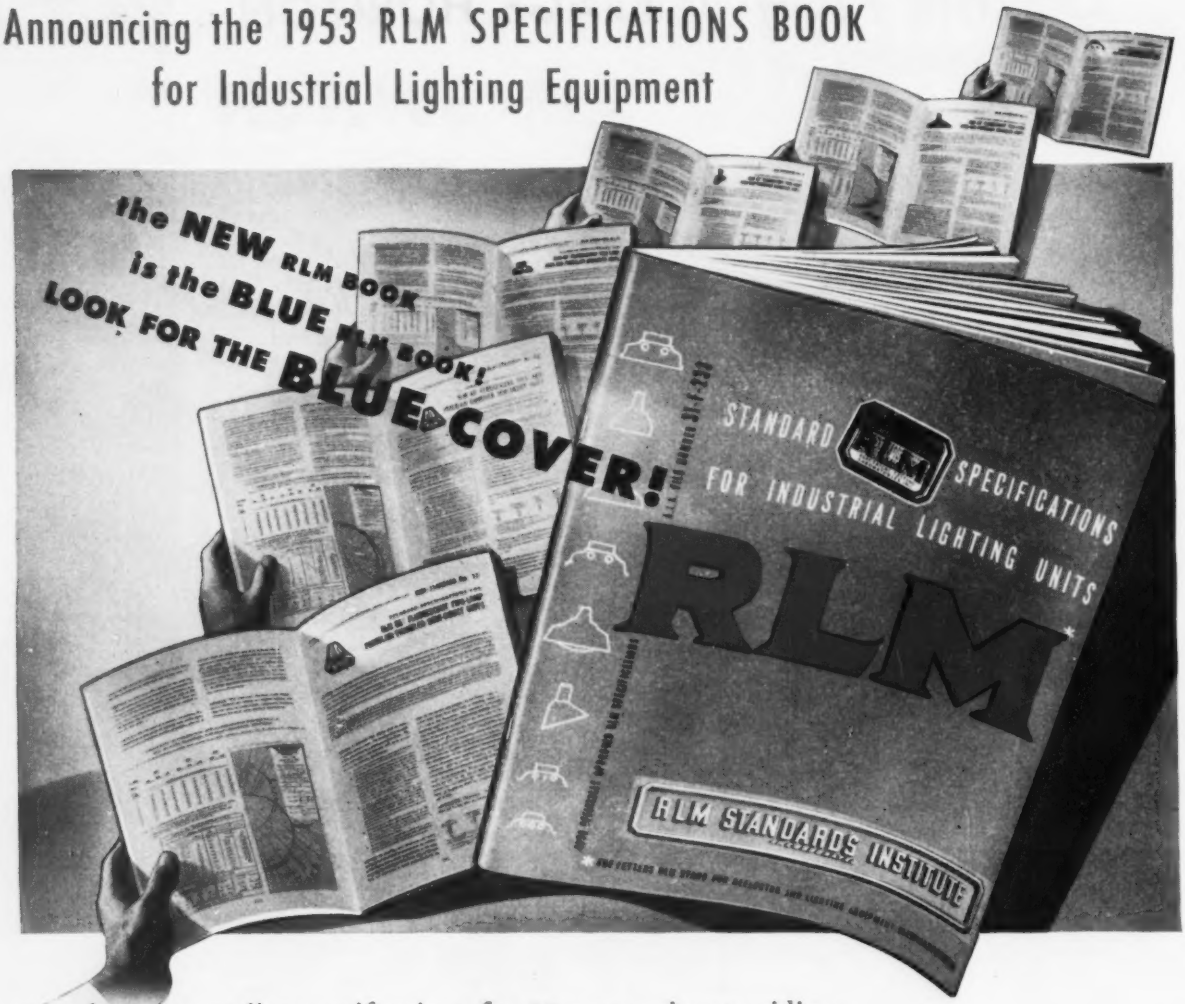
ENCLOSED, ED PHASE TY BUSES

TERLOCK EMS

METAL CUBICLES

TESTING DEVICES

Announcing the 1953 RLM SPECIFICATIONS BOOK for Industrial Lighting Equipment


the NEW RLM BOOK
is the BLUE RLM BOOK!
LOOK FOR THE BLUE COVER!
STANDARD SPECIFICATIONS FOR INDUSTRIAL LIGHTING UNITS
RLM
RLM STANDARDS INSTITUTE

contains RLM quality specifications for 15 new units providing
GREATER UPWARD LIGHT for even better industrial seeing conditions
plus IMPORTANT REVISIONS AND ADDITIONS to the other 68 RLM Specifications

Your copy of this newly-published reference book on industrial lighting equipment is ready now at no cost or obligation. Tens of thousands of architects, lighting engineers, electrical contractors, industrial executives and others have for 10 years relied on the RLM Specifications Book as an invaluable aid in measuring illumination, construction and performance standards, which are basic to lighting equipment efficiency, economy and ease of maintenance.

This new 1953 "blue-cover" edition is even more useful and valuable. It incorporates long-awaited specifications for 48", 72" and 96" RLM Semi-Direct Fluorescent Units. The new specifications cover 15 variations of this new "Upward Component" unit which directs from 20 to 30% of the light upward.

Altogether, this greatly-enlarged 1953 RLM Specifications Book has 52 pages, covering 83 different types and sizes of RLM-certified incandescent, fluorescent and mercury industrial lighting units. All specifications have been brought up-to-date in accordance with latest illuminating engineering developments.

Whether you buy, sell or specify industrial lighting equipment, you are invited to send for your FREE copy of the 1953 "blue-cover" edition of the RLM Specifications Book. Address request on your letterhead, please, to: RLM STANDARDS INSTITUTE, SUITE 821, 326 W. Madison Street, Chicago 6, Illinois.

LOOK FOR MANUFACTURER'S NAME
RLM
ELECTRICAL TESTING LABORATORIES, INC.

RLM STANDARDS INSTITUTE
INCORPORATED

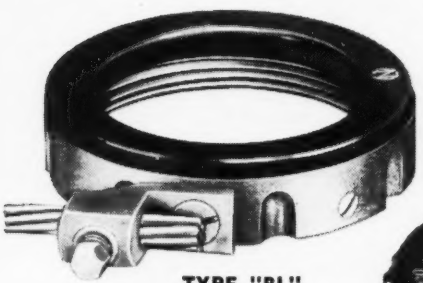
The letters RLM stand for Reflector and Lighting Equipment Manufacturers

R291

THERE'S AN O.Z. BUSHING FOR EVERY JOB

TYPE "B"

Strongest insulating bushing available! Exclusive design permanently locks insulation into casting.



TYPE "BL"

Same as proven Type "B" with lug for quick, positive ground connections. Set screw in casting facilitates positioning.

Finest, high-strength, all-Bakelite insulating bushing. A top quality bushing—competitively priced!

TYPE "A"

All-Bakelite bushing with male thread for insulation of exposed cables passing through holes in metal boxes or troughs.

TYPE "BB"

Over 35 years of specialized experience in the design and manufacture of conduit fittings is behind the complete line of O.Z. insulating bushings. Whatever your insulating bushing problem, you can be sure there is an O.Z. design to fit your application perfectly. Buy O.Z. bushings from your local electrical distributor.

O.Z. ELECTRICAL MANUFACTURING CO., INC.

262 BOND ST. • BROOKLYN 2, N. Y.

CAST IRON BOXES • SOLDERLESS CONNECTORS
CABLE TERMINATORS • GROUNDING DEVICES
POWER CONNECTORS • CONDUIT FITTINGS

Representatives in all principal cities

Roeplastic control cable–

THE ONLY CONTROL CABLE WITH CIRCUITS *POSITIVELY* IDENTIFIED

THIS NEW Roebling ROEPLASTIC Control Cable makes circuit identification quick and certain for the first time in history. A workman can't go wrong even if he's color blind. Here's why:

In ROEPLASTIC Control Cable, each conductor is identified from end to end by both its IPCEA code color name and its individual number by means of an indelible printing against a strongly contrasting background. The printing is permanent; it cannot fade or rub off... identification is always positive whether plans show circuits by color code or by numerals.

Roebling ROEPLASTIC Control and Signal Cables are ideal for such purposes as remote control of motors, switch gear, automatic machinery, etc.... for traffic light control, relay, metering and supervisory circuits. They are made in constructions, types of insulations and over-all sheaths to meet every specific requirement. Write for technical data... and order ROEPLASTIC Control and Signal Cables from your Roebling distributor. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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CF&I

JAR

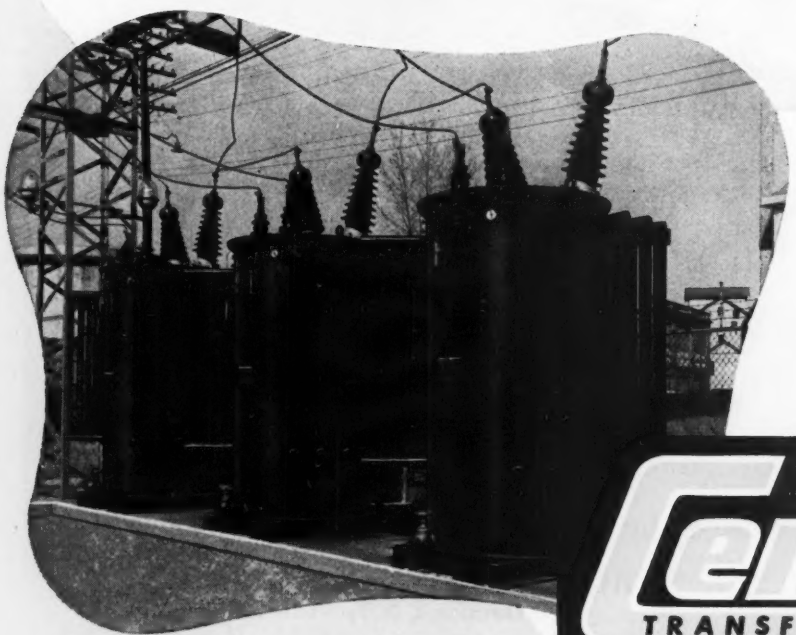
"TRANSFORMERS? . . . we give you this vitally important 3-way combination, at Central!"

G. A. SMITH
Plant Manager
Central Transformer Corp.

"A transformer, built to give efficient service year after year, is the result of combining (1) the highest degree of engineering skill, (2) materials of the best grade obtainable, and (3) competence in every step of manufacture.

"In our plant, top quality is built into every transformer, starting in the engineering department and extending throughout the plant, until the product is complete, tested and shipped. We know that our policy of QUALITY, rather than quantity, is paying dividends, as the demand for CENTRAL TRANSFORMERS is steadily increasing."

— G. A. Smith



Three 667 KVA Power Transformers.
69 KV Primary.

A Type for Every Need:

Transformers in sizes from 3 KVA to 10,000 KVA, up to 115 KV primary class.

Central
TRANSFORMER CORP.

PINE BLUFF, ARKANSAS
SALES OFFICES IN PRINCIPAL CITIES

CONDULETS* are ... they're made right

Type LB
Obround Condulet

Type FS Threaded,
With Pilot Lamp Receptacle,
Switch, and Plug Receptacle

Type EPC Explosion-Proof
Motor Starter and
Circuit Breaker
Conduit

Six-spindle automatic screw machine performs six operations simultaneously — makes dozens of hub reducers or conduit union parts every minute.

Crouse-Hinds modern methods produce a superior product . . . to serve you better

Crouse-Hinds factory is equipped with the finest modern machinery, designed for fast, accurate production. To turn out the quality work of which they are capable, such machines require expert handling. Crouse-Hinds machinists have the skill that can come only from long years of careful workmanship. A high percentage have more than twenty-five years of loyal service to their credit. These highly trained machine operators are producing a superior product . . . to serve you better.

More than 15,000 types and sizes of Condulets are listed in the Condulet Catalog . . . a type for every purpose in hazardous and non-hazardous locations.

Always specify Condulets and get the benefit of Crouse-Hinds quality on every job.

When quality counts . . . you can count on Condulets*

*CONDULETS are made only by CROUSE-HINDS

CONDULET
First in the field
STANDARD OF QUALITY

A Nationwide Distribution Through Electrical Distributors

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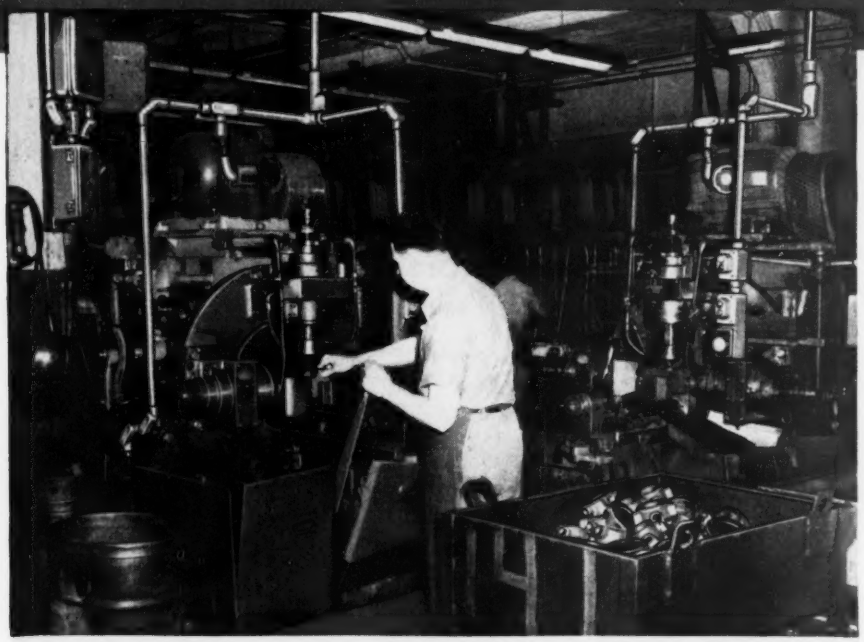
CONDULETS · TRAFFIC SIGNALS

tops in quality to last longer



One machinist operates two semi-automatic tapping machines, each of which threads four Condulet hubs simultaneously to insure perfect alignment of the final conduit installation.

Pneumatic wrench is adjusted to provide exactly right amount of torque to fasten globes rapidly and securely into globe holders for explosion-proof lighting fixtures.

Type EVA Explosion-Proof Lighting Fixture

Type FLB Explosion-Proof Circuit Breaker Condulet

Type ARE Plug Receptacle With Spring Door

Type LBH Explosion-Proof Condulet For Pulling Cable

Type GUAC Explosion-Proof Junction Condulet

FLOODLIGHTS • AIRPORT LIGHTING

SPECIFICATION SHEET

THESE ARE THE REASONS FOR SPECIFYING ORANGEBURG FIBRE CONDUIT:

- ★ Lasts indefinitely.
- ★ Impermeable wall.
- ★ Lays faster and at lower cost than any other type of conduit.
- ★ Low coefficient of friction.
- ★ Resists acids, alkalies, salt, grease, oil.
- ★ Light and easy to handle.
- ★ Easy to tool on the job.
- ★ Tough and resilient — it does not crack or break when properly handled.
- ★ Orangeburg is a leader in every city and state.

Write to Dept. EW-83 for complete catalog.
Orangeburg Manufacturing Co., Inc., Orangeburg, New York

ORANGEBURG® FIBRE CONDUIT

STANDARD with concrete
NOCRETE without concrete

NOCRETE INSTALLED WITHOUT CONCRETE ENCASEMENT

STANDARD INSTALLED WITH CONCRETE ENCASEMENT

GENERAL ELECTRIC SUPPLY COMPANY
A DIVISION OF GENERAL ELECTRIC DISTRIBUTING CORPORATION

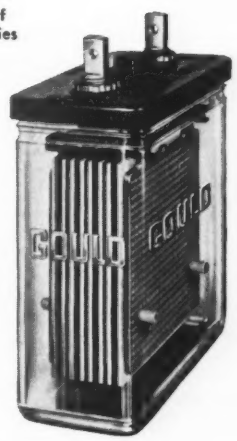
DISTRIBUTORS, ORANGEBURG FIBRE CONDUIT
BRANCHES AND STOCKS IN PRINCIPAL CITIES

Graybar ELECTRIC COMPANY

EXTRA CAPACITY
For Emergency Loads-
THANKS TO BATTERY POWER!

Gould Planté Batteries give you *extra* capacity to handle emergency loads . . . *extra* operating assurance . . . *extra* low per annum cost. Because these batteries have thick PURE LEAD positive plates, they last years longer than ordinary standby batteries. In fact, the extra years of service you get from a Planté, make it the lowest cost standby battery you can buy!

Specify
GOULD PLANTÉ—
The Aristocrat of Stationary Batteries



GOULD INDUSTRIAL BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, N. J.

Always Use Gould-National Automobile and Truck Batteries

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"We Saved Money and got better Protection for TWO Customers by switching to FUSETRON *dual-element* FUSES"

"Fusetron Fuses made it possible to use smaller size switch."

"Early this year I had the opportunity to lay out a wiring job for the Nehi Bottling Works at Boise, Idaho.

"After figuring the job with ordinary fuses it was found necessary to use a 400 ampere 250 volt main switch to carry the load.

"The proprietor of the bottling works felt that the cost was too great. I, therefore, refigured the job with Fusetron fuses and I found that I could use a 200 ampere 250 volt switch which besides being less expensive would result in better protection.

"Needless to say the proprietor was happier with the lower cost and I received the electrical contract."

Start Saving

FUSETRON dual-element FUSES do more than protect against short-circuits —they give 10 POINT PROTECTION

1 Protect against short-circuits.*

2 Protect against needless blows caused by harmless overloads.

3 Protect against needless blows caused by excessive heating — lesser resistance results in much cooler operation.

4 Provide thermal protection — for panels and switches against damage from heating due to poor contact.

5 Protect motors against burnout from overloading.

6 Protect motors against burnout due to single phasing.

7 Give DOUBLE burnout protection to large motors — without extra cost.

8 Make protection of small motors simple and inexpensive.

9 Protect against waste of space and money—permit use of proper size switches and panels.

10 Protect coils, transformers and solenoids against burnout.

*Fusetron Fuses have high interrupting capacity as shown by tests of the Electrical Testing Laboratories of New York City in December, 1947.

FUSETRON is a trade mark of the Bussmann Mfg. Co., Division of McGraw Electric Co.

"Heating in a main switch was causing fuses to blow until a Wholesaler's Salesman showed us how to cure the trouble with FUSETRON dual-element Fuses."

"During 1948 I was confronted with a bad heating problem in a 600 ampere 250 volt switch at Falk's Department Store, Boise, Idaho.

"When we checked the load on the switch we found that only 380 amperes were flowing. Even with this load the ordinary fuses used would melt and open every 30 to 90 days.

"The result of these fuse blows was confusion and annoyance to both customers and employees.

"At the suggestion of a local wholesaler's salesman 600 ampere 250 volt Fusetron dual-element Fuses were installed.

"The heating in the switch stopped immediately and we have not had that type of trouble since."

R. M. Alloway
Alloway Electric Co.,
Boise, Idaho.

One needless shutdown . . . one lost motor . . . one destroyed switch or panel . . . one burned out solenoid . . . may cost you far more than replacing every ordinary fuse with a FUSETRON dual-element fuse **now!**

FOR INFORMATION, MAIL THIS COUPON TODAY . .

with Fusetron Fuses

BUSSMANN Mfg. Co. (Division of McGraw Electric Co.)
University at Jefferson, St. Louis 7, Mo.

Please send me complete facts about FUSETRON dual-element Fuses.

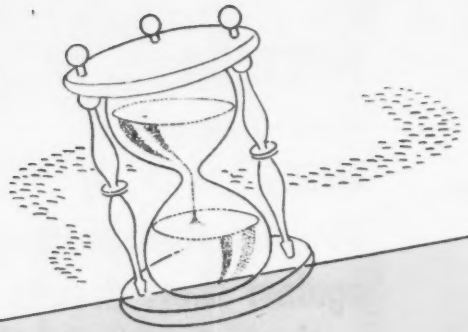
*Name*_____

*Title*_____

*Company*_____

*Address*_____

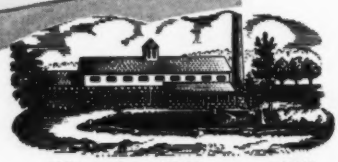
*City & Zone*_____ *State*_____ EW 8-53



KERITE CABLE-GRAM

TIME IS THE MEASURE OF ALL THINGS. FEW OF MAN'S INVENTIONS CAN STAND ITS MERCILESS JUDGEMENT. YET KERITE FOR OVER 90 YEARS HAS THRIVED AND SPREAD AND GAINED THE CONFIDENCE OF THE USERS. TIME, INDEED, GIVES KERITE ITS UNQUALIFIED RECOMMENDATION.

THE VALUE AND SERVICE LIFE OF A PRODUCT CAN BE NO GREATER THAN THE INTEGRITY AND CRAFTSMANSHIP OF ITS MAKER.



DAYS KERITE

KERITE CABLE

THE KERITE COMPANY—30 Church St., New York 7, N. Y.
Offices also at 122 S. Michigan Ave., Chicago; 582 Market St., San Francisco;
3901 San Fernando Rd., Glendale 4, Calif.; 31 St. James Ave., Boston

Good Enough in Lighting Sales?

By far the largest contribution to revenue from those customers classed by the statistician as "small light and power," is made by lighting. That revenue, total for the country, was up 6.6% in 1949 over 1948, up 8.5% in '50 over '49, up 9.7% in '51 over '50, but up only 8.2% in '52 over '51. After three years of acceleration, the increase has slowed down.

Searching analysis would probably show several reasons for this deceleration. But we prefer the one advanced by Bob Butts, chairman of the Edison Electric Institute Commercial Lighting Committee, at the institute's general sales conference last spring. He said that activity in new construction and extensive remodeling of stores, shops and offices was petering out and utilities could not depend any longer on that as the largest factor in increased revenue from small light and power customers. He urged power companies to put much more effort into selling relighting in existing premises if they wanted that revenue to continue increasing as fast as in recent years.

Listening to Mr Butts, we thought he had in his voice even more than the usual salesman's feeling of urgency, of evangelism. We think we know now why he laid it on. In his position as committee chairman he probably was familiar with a condition that is, shall we say, adumbrated in the survey featured in this issue of Electrical World.

We would not say that the report of this survey indicates strongly that electric utilities are not so interested in selling commercial and industrial lighting as for their good they should be. But the survey does make us suspect that this is indeed the case.

If true, isn't it strange? The kilowatt-hours that light a store are more productive of that much-to-be-desired net than those sold for any almost other use. We had always assumed that all utility managements were happily cognizant of this interesting fact and that they rejoiced exceedingly at increase of business in this field. Can it be we have been mistaken all these years?

The impression taken from working with this survey seems to reflect what has been disclosed by investigations made for the Lighting Equipment Section of the National Electrical Manufacturers Association in various cities. It is that only a very small proportion of sales of lighting equipment in any city—around 2 or 3%—is influenced by the local utility. Most of the sales have been, not for relighting, but for refixturing from which the user gains little in improved illumination and the utility as little in increased revenue.

But it was not the purpose of the survey to collect evidence on how well or how poorly utilities are doing in selling relighting. If it had been, possibly a better or a worse, but certainly a more definite, impression than has been so delicately intimated here would have been taken from the replies. The purpose was to compile as well as might be a comprehensive listing of the details of operation and organization for lighting sales that are in general use. In this the survey was successful. We like to think that utility sales executives will find our report of it helpful.

"Rich in Good Works"

Too small to bother with. A market of only, at most, several thousand, and a special one at that, would be of no interest to an industry whose production is counted in millions of units. The market is the blind homemakers of the nation who are prevented by their disability from full enjoyment of the conveniences of electrical living.

St. Paul wrote to his disciple, Timothy:

"Charge them that are rich in this world that they be not highminded, nor trust in uncertain riches, but in the living God who giveth us richly all things to enjoy;

"That they do good, that they be rich in good works, ready to distribute, willing to communicate,

"Laying up in store for themselves a good foundation for the time to come, that they may lay hold on eternal life."

In Electrical World, February 23, 1953, page 152, there was printed a story by Edith Hitchcock, Alabama Power Co, about instruction in use of electric appliances at the school for the blind in Talledega. Now comes a letter from Rosa Lee Armstrong, Carolina Power & Light Co, published in this issue. Miss Armstrong tells of her work in teaching blind homemakers how to cook on the electric range, suggests that comparatively small adaptions can make electrical appliances much easier for the blind to use, and asks Electrical World to advance that idea to appliance manufacturers. Which, with the help of St. Paul, we do here.

The American Foundation for the Blind, Inc, has already done considerable work in adaptation of certain kitchen utensils for use by blind people but nothing with electric appliances. We are sure that the foundation and other like organizations would be delighted to cooperate with appliance manufacturers in this direction.

Is the market really too small, too troublesome, to bother with? Or does the appliance industry desire to be "rich in good works, ready to distribute," to do what it can to give to the blind homemaker as well as to her more fortunate sisters "richly all things to enjoy?"

Commission Orders Storm Plans

Southern Connecticut suffered a crippling ice storm in January, and out of it has come considerable indication of the mood of the regulatory commission toward the utility handling of the widespread outage. The state's Public Utilities Commission has ordered the companies to strengthen their plans and organization to meet future emergencies. Feeling seemed to run through the order that prevailing plans were good but not adequate.

This insufficiency could be met, the commission says, by coordinating and centralizing the joint programs, particularly as to weather warnings, available contractors, and information. Further the local and state police should be included along with defense agencies. Tree protectionists and specialists should be drawn in to alleviate the damage to wires by ice-laden trees. On the whole the desire is to have the utilities fortify themselves and keep the commission advised periodically that this is being done. The commission also believes better information about progress of restoration should be available to inquiring customers.

Of technical interest is the admission that underground construction is much too expensive to be dashed to as the immediate remedy for interruption of overhead wire systems. Very sensibly the commission recognizes aerial cable of some form as the logical alternative to explore. In fact the utilities were ordered to "begin a joint study of the use and development of aerial cable, reporting to the commission within six months the progress of the development and at least annually thereafter."

Here then will probably be the first thorough-going analysis of aerial cable to find out its merits and demerits and how these can be reconciled and capitalized. Out of this January ice storm and the hearings comes the prospect that manufacturers, utilities, the regulators, and the public will all get the benefits of better service in emergencies at far less cost than underground once the facts are known about the alternatives.

Remember Voltage Requirements

The overload capability of distribution transformers has intrigued operating engineers for years. It seems to offer opportunity to achieve fuller use of a costly portion of the distribution system. How about voltage drop?

At first operators overloaded strictly on their own, without sanction of codes or manufacturers. But the advent of the CSP type of transformer focused recognition of the principle of loading distribution transformers by temperature. So began an upward spiral of loading.

The limit has been that combination of load and time which is equivalent in insulation deterioration to continuous operation at nameplate loading. Now laboratory investigations indicate that these accepted temperature limits are too conservative. Transformers can operate at materially higher loadings and still enjoy long service life. The spiral continues upward.

But are we, in our enthusiasm for heavier loading, overlooking something? Have we forgotten that distribution transformers even at nameplate loading cause some 2 to 3% voltage drop, and that this drop increases in proportion to loading? If we seriously accept delivered voltage as a design limit, then heavier loading of transformers must have a compensatory voltage reinforcement elsewhere. And in many cases this reinforcement must be in secondary mains where it may be costly.

Distribution engineers are well aware that today's transformer is lower in losses and regulation than its early predecessor. Loading practices today take advantage of all that gain—and more.

Transformer designers have earned commendation for their recent shift to new magnetic steels, new insulating methods, and new manufacturing techniques. Their efforts have produced better transformers with material reduction in size and weight.

But the voltage regulation of these new transformers has not kept pace. Here and there we hear the statement that voltage—not temperature—limits distribution capability. But where new designs or new temperature limits are the topic, that cry is lost in the wilderness.

So we submit that the time has come to hear that cry. Fluorescent lamps and TV have made voltage more critical than ever before. Utilities must seek further improvement in transformer regulation. Their distribution engineers can utilize the new-found load capability only so far as delivered voltage meets customer needs.

THE ELECTRICAL WEEK

The Issue's News Highlights—Electric Energy, Inc, names Bechtel Corp to replace Ebasco as general contractor for construction of its Joppa plant . . . Tennessee's governor charges that Eisenhower Administration lacks "true facts" on TVA.

Seventeen Democratic senators introduce bill giving Congress veto power over licenses granted by FPC and use occasion to blast GOP power policy . . . Digby fills last vacancy on FPC. . . . Comparative costs on Snake River power are discussed at hearing . . . Power Act is amended to permit foreign interties without federal regulation.

New methods of pulling pipe-type cable developed by Consolidated Edison of New York make possible underwater installations of unspliced lengths of over 6,800 ft . . . Mississippi Power completes laying one of South's largest underwater cables, 5,600 ft long with outside diameter of about 4½ in., under Back Bay at Biloxi.

Off the New England Wire—An unusual Supreme Court finding in Rhode Island asks Public Utility Administrator T. A. Kennelly to produce his reasons for allowing New England Telephone & Telegraph Co a $1,168,000 a year rate hike as compared with $2,150,000 a year requested. Smaller rise yields 4% and larger 7½% on rate base. Company appealed to high court, saying the administrator did not state what he considered a fair return. Court does not direct Kennelly to make new or different rates, but to give "proper and arithmetical and legal basis of his decision."

St. Albans, Vt., City Council votes 4-to-2 against proposal for a municipal electric plant. City is now served by Central Vermont Public Service Corp, which recently purchased Public Electric Light Co.

While Puget Sound P&L and Washington WP extended to Nov. 19 their agreement to merge, public power forces continued their attempts to convince Washington State PSC that such a merger is not in the public interest. Agreement originally was scheduled to expire July 30, but hearings before PSC still were in progress on that date, with a hearing yet to be held by FPC. Approval by stockholders of both companies also will be necessary. WWP's Counsel Alan Paine said WWP's commitments for financing had been extended from July 30 to Dec. 31. These commitments with four New York banks provide for loans up to $45 million with which to effect the merger.

Minnesota Mining & Manufacturing buys Irvington Varnish & Insulator Co, Irvington, N. J., for $7 million.

Seven major Ohio electric utilities and two gas companies are cooperating in an educational program to acquaint members and their staff of Ohio PUC with all phases of electric and gas company operations. Present plans call for a two-day "classroom" session to be held every two months. Classes, to be conducted by staff members of the nine participating utilities, will avoid highly technical problems or specific company policies.

Off the Washington Wire—Cutback in federal appropriations will not be directly reflected in major power construction for this fiscal year. Carryovers from previous appropriations will make up the differences. Examples: Congress voted TVA $178 million for power construction, but the agency will spend an estimated $295 million this year. USBR received $116 million in new money, but with carryovers it has $172 million for actual spending . . . New Hoover commission on governmental organization will take a sharp look at federal power policy . . . New England Power has been allowed a 5.6% rate increase on its wholesale power sales.

Combined utility and industrial generating capacity in U. S. now tops 100 million kw, FPC reports. Utilities added 2.8 million kw in first half of year to put capacity over the 100 million kw mark . . . Average residential bills continue slight upward trend according to FPC study released this month . . . Scenic beauty and recreational value wins over power production as FPC denies a license to Namekagon Hydro Co for proposed 15,000-kw project on Namekagon River in Wisconsin.

USBR has signed up to serve Ames Aeronautical laboratory in California with 50,000 kw of firm power and 210,000 kw of non-firm power by 1957. Power will come from the Central Valley project.

National Hells Canyon Association promises to bring pressure on Interior Department to allow its experts to aid the fight for a high federal dam at Hells Canyon.

Congress takes no action on bill to "de-authorize" federal Priest Rapids hydroproject and direct FPC to grant a license to Grant County PUD.

Consolidated Edison of New York will pay Sept. 15 a quarterly common stock dividend of 60¢ a share as compared with 55¢ in previous quarter . . . Minnesota P&L stockholders will meet on Oct. 1 to vote on a 2-for-1 stock split.

Pennsylvania Electric reduces rates of 1,870 industrial and commercial customers an estimated $316,000 a year . . . New Jersey Board of PUC reserves decision on New Jersey P&L proposal which asks that 5% surcharge on all bills be imposed until $578,000 has been collected. Company contends this is the amount it should have collected during 1951, 1952, and five months of 1953 to bring the rate of return to 5.53%.

Kentucky Utilities connects its 200,000th customer while Pennsylvania Power Co connects its 75,000th consumer.

Congratulations—Copperweld Steel promotes I. M. J. Kaplan from manager of sales, special products, of wire and cable division to vice president.

Obituary—Gaylord B. Buck, 59, vice president and commercial manager of the Public Service Co of Colorado, died Aug. 2 at Denver . . . Fay Woodmansee, 78, chairman of the board of Electrical Engineers Equipment Co, died on July 28.

Bechtel to Finish Building of Joppa Plant

● Electric Energy, Inc, names San Francisco firm to complete work on its big steam plant on the Ohio River after cancelling contract with Ebasco Services

● Labor troubles, steadily rising costs, and lag in construction are given as reasons for the change

Electric Energy, Inc, last week named Bechtel Corp, San Francisco, as general contractor for its 935,000-kw plant at Joppa, Ill. The electric company earlier had announced it was terminating its construction contract with Ebasco Services, Inc, New York. Ebasco, however, will continue to supply engineering services to the project.

Construction work on the $159-million power plant halted July 30 after Ebasco had been notified of the cancellation of its contract. J. Perry Yates, senior vice president of Bechtel, announced construction would resume as soon as arrangements could be made "for work to start on an economical basis and to continue without interruption."

Two of the power plant's six generating units are on the line and the third is expected to be in operation by November this year and the fourth the beginning of next year. Work on the last two units had been started.

The plant will supply power to Atomic Energy Commission's gaseous diffusion plant at Paducah, Ky.

Main reasons for cancellation of the Ebasco contract were believed to be labor troubles and delays in meeting completion schedules and steadily mounting costs. Construction at Joppa is seven months behind schedule.

Costly Delays

J. W. McAfee, president of Electric Energy, said the contract was being terminated "in order to permit reorganization of the project so the construction can be completed on a more efficient and economical basis." He said the reorganization was necessary because of "lack of productivity and consequent increased cost characterizing the work so far."

"This move is one which the directors have had under consideration for some time," McAfee added. "However, operation of the second unit as soon as possible was of such importance to the Atomic Energy Commission Paducah project that action could not be taken earlier."

Ebasco Statement

Fred C. Gardiner, executive vice president of Ebasco, issued the following statement:

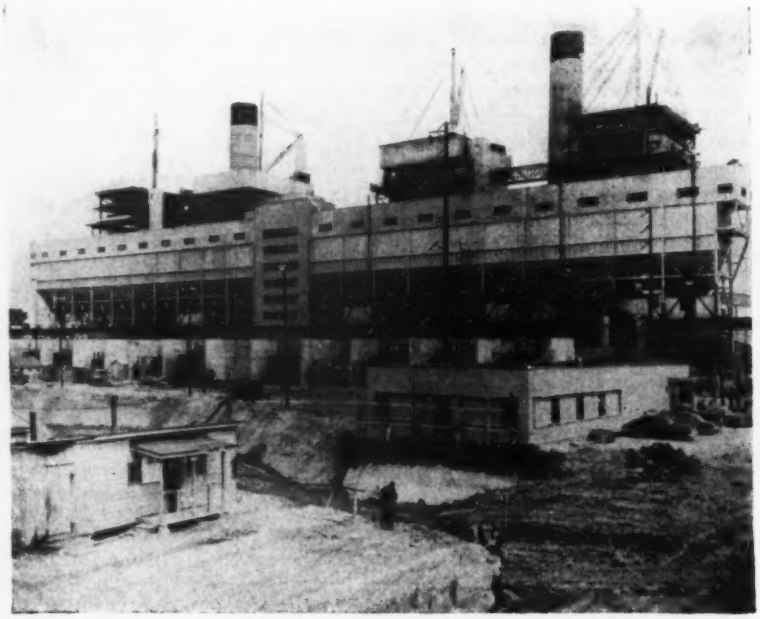
"The reorganization of the construction work of the six-unit electric generating station at Joppa, Ill, being built by Electric Energy, Inc, is the result of local conditions which have prevailed almost from the start of the job and have affected adversely not only the cost but the progress of construction work."

Since the project was started in 1951, construction work has been interrupted at least 34 times by major and minor work stoppages. Ebasco blamed the labor situation for the rising cost estimates which has marked construction progress at the plant.

The same situation has prevailed at the Paducah atomic project where there have been 78 or more strikes, and at Tennessee Valley Authority's Shawnee project which has been struck about 30 times. Shawnee plant will supply power to the atomic project.

Delay on the Joppa construction has hurt no one but the five companies making up Electric Energy—Union Electric Co of Missouri, Central Illinois Public Service Co, Illinois Power Co, Kenucky Utilities Co, and Middle South Utilities, Inc. Because gaseous diffusion facilities can be built more rapidly than power generating plants, these companies agreed to supply initial needs of the Paducah plant out of their own reserves. By mid-1953, the companies had hoped the Joppa plant would have taken over all the requirements for which they had contracted.

But the first generating unit—due last fall—started operating at Joppa in May. The second has just gone on the line. So the Electric Energy companies must continue making up from their own reserves the deficit in power they had expected Joppa to supply AEC. This not only taxes the companies' normal operations but is more expensive than transmitting power from Joppa to Paducah.



JOPPA STEAM PLANT, which now is half-way completed, is shown as it appeared last April

Ike Rapped on TVA

Clement of Tennessee criticizes administration policy at Governors' Conference

Governor Frank C. Clement of Tennessee charged last week at the Governors' Conference in Seattle that the administration lacks "true facts" on such public power developments as TVA.

Governor Clement called on President Eisenhower to make a personal investigation of the power development situation.

Clement declared that "high leaders of government" are misinformed on the facts and rely exclusively upon information supplied by Edison Electric Institute to the detriment of public power.

A "deliberate conspiracy from outside the ranks of responsible government" is responsible for much of this misinformation, he said.

The Tennessee governor urged that an attempt be made to agree upon the true facts, after which theories of government could be analyzed in their relation to the problem of power development.

Meeting Planned . . . Upon arrival at the Governors' Conference, Secretary of Interior Douglas McKay disclosed that he expects to meet with the Army Corps of Engineers early in September in an effort to set up priority for construction of hydroelectric projects now under study.

"Just the normal growth of the Pacific Northwest by 1960 will tax present project," he said. Biggest problem now, he concluded, is going ahead with necessary developments as rapidly as budget considerations will permit.

He stressed, however, that the federal administration is strongly opposed to federal monopoly in the construction of power projects.

"Development of the Pacific Northwest is a collosal job and we'll never see it finished," he said. "It will take the combined efforts of the federal government, state and local government and private interests."

President Eisenhower, in his address to the governors, referred to public power only in a pledge that the federal government would not participate in projects which could be carried on at the state level.

Mobile Crane Splinters Utility Pole

A mobile crane snapped this power pole in two at Pendleton, Ore, when the driver made a wide turn and the boom swung free. The pole carried a 12-kv circuit, a 4-kv circuit, a street light, and a secondary circuit. No one was injured.

GOP Power Policy Criticized

Democratic senators introduce bill to give Congress veto over FPC licenses, blast federal action in electric field

Republican power policy drew a withering barrage of sharp-pointed criticism as the Senate rang down the curtain on the first session of the 83rd Congress.

A sizable block of Democratic senators consider Republican action in the power field as a promising issue in next year's Congressional elections. With an assist from Sen Wayne Morse (Ind., Ore.), Administration critics on the last day of the session filled more than 25 pages of the Congressional Record with blasts against the emerging federal power policy.

Jackson Is Leader . . . Sen Henry M. Jackson (D., Wash.) led 16 other public power senators in introducing a bill to give Congress a veto power over licenses issued by the Federal Power Commission. The veto would be applicable to any license issued where the proposed project deviates from a federally drawn basin development plan.

Jackson made no immediate attempt to gain favorable action on the bill. At the time it was offered in the Senate, he and several other administration critics were aboard a plane with President Eisenhower winging toward the Governors' Conference in Seattle.

Morse Bows with Flourish . . . A considerable share of the oratory was furnished by Senator Morse, who held the Senate in session until past midnight for an academic political resume of Republican actions in the public power field. He centered his fire on the administration action in withdrawing as a special pleader for the high Hells Canyon Dam, in attempting to write more favorable contracts with electric companies in the Northwest, and in reducing funds for federal power facilities.

Concluded Morse: "The Eisenhower Administration's actions in Hells Canyon and the private utility

contracts are two of the black chapters written by the Cadillac crusaders during only six months in office.

"They are sad, they are frightening. They are part of the pattern of clipping transmission lines, cutting back dam construction schedules, paring REA funds."

Support for Jackson . . . Sen Olin D. Johnston (D., S. C.), who seldom speaks on power matters, got into the act. He called for support of the Jackson bill, and lashed out at Congressional action restricting the use of the Southwestern Power Administration continuing fund. These restrictions prevent SPA from carrying out lease-purchase contracts for rural co-op electrical facilities.

Referring to the report which restricted use of the fund, Johnston said: "Now comes the 'Raw Deal,' a policy using an appropriation bill as its vehicle, forcing these rural cooperatives into a bankrupt sale of their facilities to private power monopoly."

Hits TVA Cuts . . . Sen Estes Kefauver, Tennessee Democrat, hit hard at the cutback made in appropriations for the Tennessee Valley Authority, and called for a special session of Congress to take care of urgent power matters.

Said Kefauver, "We in this first session of the 83rd Congress have done almost every thing that we possibly could to cripple and hamstring the development of public power in this nation. We from the Tennessee Valley area were crippled, but when we look at what has happened to other sections we are inclined to believe that we were rather fortunate."

Sen James E. Murray, Montana Democrat, made an all-out attack on the appropriations cuts for federal power facilities. Of the Pacific Northwest, he said:

"The Eisenhower budget cut Bonneville Power Administration expenditures, needed to relieve an existing power shortage. . . .

"The great Dalles Dam has been put out of operation for a year by budget bombing. . . .

"We stopped several transmission facilities such as the Palisades-Idaho Falls line in Idaho.

"We prevented generators from being placed in the American Falls Dam in Idaho.

"We held up the Roya plant in Washington.

BPA Pilot Meets Death in Columbia River

Body of Bonneville Power Administration pilot John D. Shield is pulled from his wrecked craft after it struck a 2.4-kv Portland General Electric Co feeder line and plunged into the Columbia River. A Coast Guard vessel is used in operations to recover the body, and raise plane.

The drowned pilot was airlifting BPA equipment to the International Airport at Portland when he swung low over the river and a bridge to a small island, striking PGE wires some 75 ft above the water. Witnesses reported the 1,500-lb helicopter struck the wires squarely, crumbling the plastic cockpit bubble. The accident occurred July 30 between Vancouver, Wash., on the Columbia north bank where BPA maintained its hangar facilities, and Portland.

These are the open, direct pinpoint strategic bombing operations against Bonneville and the Northwest to which assent has been given."

Utilities Criticized . . . New-Deal Sen Hubert H. Humphrey of Minnesota centered most of his fire on electric companies, rather than on federal actions. He hit mainly at the rapid tax amortization certificates issued electric utilities, and the advertising program of the companies:

"What a mockery—to have this private power propaganda campaign against our federal power policy subsidized by the taxpayers and electric consumers; to charge us for their battle against us."

New York Democratic Sen Herbert H. Lehman confined his last day attack to actions on behalf of private and state development of additional power at Niagara. In a long memorandum inserted into the Congressional Record, the New York Democrat made a point-by-point rebuttal of Gov Thomas E. Dewey's testimony in behalf of state development of Niagara power.

Republicans were either caught off guard by the slashing attacks on power policy, or chose to disregard them. They made no attempt to meet these criticisms head-on. Not a single Republican senator took to the floor to defend either administration or Congressional action in the electric power field.

Will Construct Plant

Delaware Power & Light Co, Wilmington, Del., has announced plans to build an 88,000-kw generating plant on the Indian River between Millsboro and Dagsboro in Sussex County. Cost of plant is estimated at $30 million.

Digby Fills Last FPC Vacancy

Louisiana Democrat wins Senate confirmation after lengthy questioning on public power and other matters

The Federal Power Commission will have its full complement of five members when Louisiana Democrat Seaborn Lee Digby moves in around Aug. 15.

President Eisenhower's latest appointee to FPC won Senate confirmation July 30 to replace Oklahoma Democrat Harrington Wimberly, whose term expired in late June.

When Digby takes over, the five-man commission will have two Democrats, two Republicans, and one independent—former Chairman Nelson Lee Smith who strongly leans toward the Eisenhower brand of Republicanism.

Long Service . . . Digby, whose record of public service in Louisiana dates back to 1919, has served as district attorney, state district judge, city attorney for his hometown of Monroe, and state commissioner of conservation. He is engaged in private practice at the present time, but has agreed to dispose of all interests in his law firm when he takes over at FPC.

In testimony before the Senate Interstate and Foreign Commerce Committee, which recommended his confirmation to the Senate, Digby testified he had "no fixed policy about public power." He said he came from a section of the country where the issue had not been raised and said he had not had the occasion to take a stand.

Open Mind on Public Power . . . In answer to questions by committee members, Digby said. "I certainly recognize the necessity of public power under certain circumstances, especially if there is associated with the creation of power the matter of reclamation, flood control, and whether the projects are such that they could not be properly handled by private industry. . . . I have no reason, and I know of no reason, why I would not have an entirely free and open mind on any issue of public power."

Digby added, ". . . I am and have always been a firm believer in the American enterprise system. But I certainly would not advocate that to the extent of doing any injury to the public interest in the way of public power."

A number of questions concerning the Hells Canyon controversy now before FPC were put to Digby by Sen Warren G. Magnuson, (D., Wash.) One key question touched upon a continuance of the hearing which is being demanded by opponents of the Idaho Power Co application to develop the Hells Canyon stretch of Snake River.

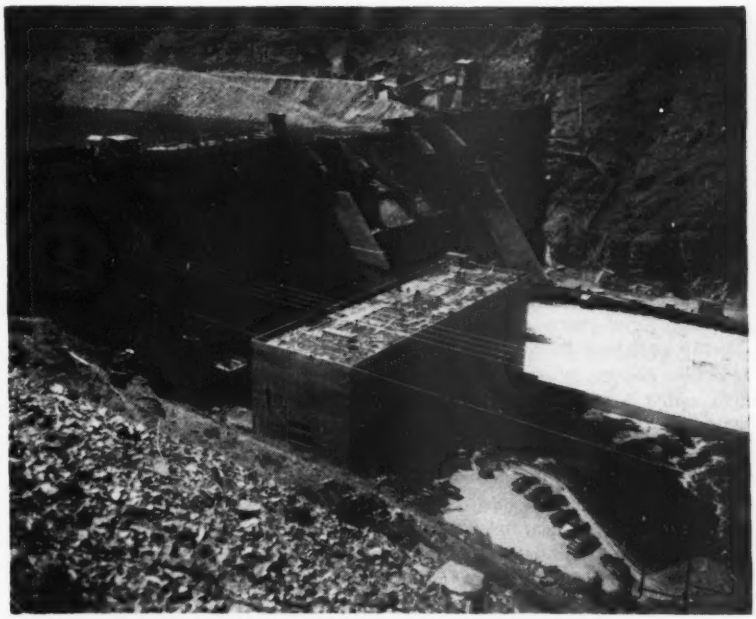
Replied Digby: "The question of reasonable continuance on the part of anybody who had not proper notice, proper time to prepare their case, I was always very liberal in that respect. I feel you would have to be, in the interest of equity, in doing right to all parties, and certainly where the question is, as you have placed it, on the part of the public interest."

Questioned Closely . . . The FPC nominee commented freely on hypothetical questions put to him on Hells Canyon by Magnuson and on Niagara power development by Homer E. Capehart (R., Ind.). but pointed out that many factors would necessarily enter into any official decision.

In answer to numerous other questions on widely divergent topics, Digby made these comments,

"I would not want to see it (Tennessee Valley Authority) sold . . . I am certain that it has filled a very wonderful place in the development and growth of the south."

As to the effect of rapid tax amortization on rate making: "The question of the exemption over a period is just favorable operating conditions, as I see it."



More Power Coming from the Missouri

Construction on the $28.8 million multipurpose Canyon Ferry Dam project (above) on the Missouri River east of Helena, Mont., is nearing completion, with the first of three 16,667-kw generators in its powerhouse scheduled to go on the line this fall. All three generators are expected to be in service by early next year.

Construction crews late in July topped off the final main block in the dam. Spillway gates are now being installed. The gates, largest radial type ever installed on a Bureau of Reclamation project, measure 34.5 ft in height and 51 ft in width. Switchyard equipment is being installed on the roof of the 200 x 130 ft power plant.

Seattle City Light Substation Gets a Dressing Down

When Seattle City Light built its first receiving substation (left panel) in 1904, it had all the gingerbread and cupolas then in vogue for buildings. The structure has long since outlived its function, both architecturally and vocationally.

Since it was structurally sound and well-located, City Light remodeled it to serve as a modern looking power dispatching headquarters (right panel). Substation wires and equipment were removed, along with the cupolas, and the building was steam-cleaned.

Utility Cites Costs...

. . . of power produced at 3-dam and high-dam Snake River projects at Hells Canyon hearing

Idaho Power Co's proposed three low-dam development of the Hells Canyon stretch of Snake River would produce power more economically than would a high-dam development, witnesses for the company testified last week.

Comparative costs of power production were discussed as the Federal Power Commission hearing went into its fourth week. The company is asking an FPC license to build and operate the low-dam development which would directly conflict with a high-dam plan formerly supported by the Interior Department.

Hearings on the electric company's application were scheduled to recess at the end of this week upon conclusion of direct testimony by power company witnesses. No time has been set for reopening the hearings for testimony by opponents of the application and the FPC staff. The recess may last a month or more.

In testimony at the current session of hearings, Robert A. Hogg, Idaho Power sales engineer, estimated that cost of energy from the three-dam development would run 1.33 mills per kwhr, compared to an estimated 3.56 mills per kwhr from the high dam development.

Hogg noted that the high dam would produce slightly more prime power annually than would the low dams, but he calculated that this small addition would cost a whopping 32.92 mills per kwhr. If the output of the high dam was sold at present Bonneville Power Administration rates—$17.50 per kilowatt year—Hogg estimated the government would have run up a deficit of $631.3 million in a 50-year period. This would be nearly twice the original cost of the proposed federal project.

3-Year Study Made . . . The Idaho power engineer said his estimates were based on a three-year study of problems involved in the Hells Canyon development. He also testified that future irrigation development upstream from the Hells Canyon site would so deplete the stream flow as to render a high storage dam unfeasible over a 50 or 60-year period.

The largest storage feasible over a 60-year period he said, would be about 1 million acre ft. This is the amount included at the company's proposed Brownlee project. The high dam development would involve about 4 million acre ft of storage.

Congress OKs Change in Federal Power Act

Congress has amended the Federal Power Act which permits electric utilities to interconnect with foreign-owned systems without coming under federal jurisdiction.

The legislation will permit Detroit Edison Co to transmit and receive power from Hydro-Electric Commission of Ontario. The long-sought 200,000-kw interconnection had been held up because it would bring Detroit Edison under Federal Power Commission regulation.

FPC later announced it had revised its rules to permit the intertie.

Other items in the week's news will be found starting on page 202.

WASHINGTON COMMENT

JESSE MOCK

Why Did Dewey Pounce On Niagara?

There can be no doubt now that Gov Thomas E. Dewey of New York stopped the private enterprise bill for Niagara power development in its tracks. Almost single-handed, he succeeded in getting the legislation bottled up in the Senate Public Works Committee this year after it had passed the House by a rousing 262-to-120 roll-call vote.

Whatever the final outcome, the measure which would permit five New York electric companies to develop an additional 1.1 million kw of power at Niagara Falls is in a much worse legislative position than its backers had hoped. If the Senate committee had reported it favorably, as the group seemed disposed to do before Dewey entered the scene, the bill would now be on the calendar and eligible for full Senate consideration early next year.

Final Senate Action Delayed . . . The Senate usually has more time available for debate on such bills at the beginning of the session while it waits for committees to process newly introduced bills. As it is now, the Niagara power bill will still be tied up in committee during a part of next session. Thus its chances for attaining final Senate action are much slimmer than they might otherwise have been.

Two posers arise in connection with the Dewey intervention:

1. Why did he pounce on the legislation in the Senate committee after showing almost no interest in House action on the matter?

2. How was he able to block Senate committee action so quickly and effectively?

Political observers here, including those who have watched Dewey at close range over a period of years, think both questions can be answered with a single word: "Politics."

Implications of the House action on Niagara power was brought dramatically to the governor's attention July 8 during a visit to Washington on another matter. On that day, while Dewey conferred with friends on the House floor, the House Rules Committee cleared the Niagara bill for floor action. The next day it was passed by an overwhelming vote.

News writers speculated at length that the governor had made the trip for the specific purpose of fighting the bill in the House. These stories put Dewey in a position of losing a battle of considerable importance to his state.

Up until that time, Dewey had been on record as favoring state development of the Niagara power but had made no fight for this view before the House. It was known that at least two members of his New York Power Authority had pleaded with him to take a personal hand in the matter.

Late but not too Late . . . Following his trip to Washington, the governor got down to work on the Niagara legislation. He wrote an open letter to the Senate Public Works Committee and a personal letter to his old political ally, Committee Chairman Edward Martin of Pennsylvania.

This bit of effort did the trick. Martin reopened the hearings, and Dewey made the first appearance in behalf of state development. The backers of private and federal development then demanded time to answer Dewey. It looks now as if they will have to wait until next year for the opportunity.

Thus Dewey at least has been able to recoup temporarily the loss-of-face he suffered by the House action on Niagara. This could mean a lot if the New York governor decided to try for a fourth term next year.

Dewey's success in stalling action by the Senate committee is easier to explain. Republican committee members are deeply conscious of the vote-getting power which Dewey wields in New York. They respect his judgment on such issues as those involved in Niagara development. They are willing to go a long way to keep the most populous state in the Republican column in next year's Congressional and gubernatorial elections. Politics is politics no matter which party is in power.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Coal producers are reported to be in better position than oil or gas to hold or even reduce costs by mechanization. Machines to extract coal at up to 3 tons per minute are promised.

Mica insulation can be damaged by ac tests near the ultimate dielectric strength.

Fully annealed aluminum has only about 1% higher conductivity than the hard drawn.

Fir poles with at least seven annular rings per inch are found not to twist in service. Compactness of annular rings is a measure of how slow the tree grew and is indicative of the land on which it grew. The number per inch increases in proportion to the height of the ground above the water course in the area.

Splice failure of an 110-kv oil-filled pipe-type cable seemed to be explained by the presence of 5 gallons of water in the bottom of the splice (low point in line).

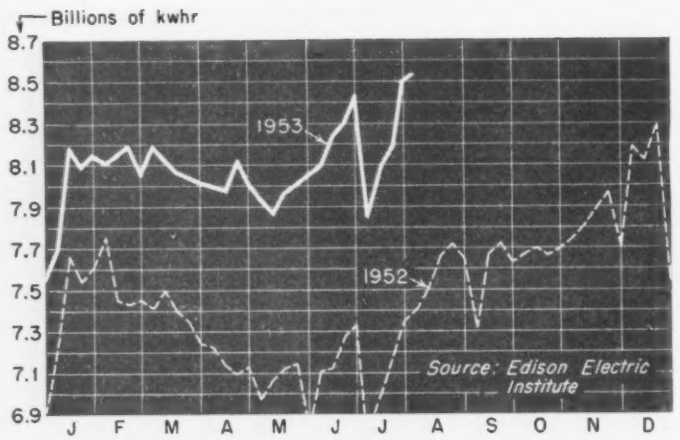
Grounding of a plant's auxiliary power system may result in loss of a feeder but that is probably preferable to risking multiple faults, prolonged shutdown and severe damage of equipment.

Cleaned aluminum contact surfaces subjected to about 20,000 psi pressure produce contact resistances of about the same minimum value with or without a corrosion inhibitor.

Air pollution prevention puts a premium on complete combustion to minimize particles entrained by the flue gas.

Sand per se is not a bad conductor of heat but air is. Therefore for backfill around buried cable it is wise to use sand presenting a minimum of voids.

STATISTICS



Output Week Ended Aug. 1—8,511,622,000 Kwhr

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Aug. 1	+14.9	+9.5	+10.1	+21.3	+13.9	+22.5	+6.5	+9.4	+9.4	+10.1
July 25	+15.4	+11.1	+11.9	+20.6	+13.2	+20.3	+9.1	+10.0	+10.0	+14.9
July 18	+14.3	+9.4	+9.6	+19.2	+13.4	+19.7	+5.5	+11.4	+11.9	+14.6

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	May	73.5	72.9	65.9
Capacity (Million Kw)	May	84.34	83.84	77.01
Production (Billion Kwhr)	May	35.98	35.63	31.82
Hydro	May	10.29	9.70	9.69
Fuel	May	25.69	25.92	22.13
Fuel Consumption				
Coal (Million Tons)	May	8.59	8.91	8.01
Oil (Million Barrels)	May	6.09	7.15	3.72
Gas (Billion Cu Ft)	May	87.85	76.58	76.99
Sales (Billion Kwhr)	May	31.32	31.75	27.94
Residential	May	8.50	8.86	7.52
Commercial	May	5.18	5.15	4.74
Industrial	May	15.49	15.46	13.83
Other	May	2.16	2.28	1.86
Net Income Class A & B Companies ($ Million)	May	82.13	86.27	68.49
Estimated Dec. '53 Peak (Million Kw)	Apr.	86.5	86.5	88.6
Kwhr per Residential Customer (12 Month Average)	Apr.	2,224	2,209	2,066
Revenue per Kwhr Residential Service (12 Month Average)	Apr.	2.76¢	2.76¢	2.79¢
Canadian Production (Billion Kwhr)	May	5.76	5.75	5.33

Business Statistics

FRB Industrial Production Index†††	June	243*	241	205
Gross National Product Annual Rate ($ Billion)	1stQtr.	363.4	361.1**	339.7
EW 5 Industry Production Index	June	130.4	130.0**	97.1
ENR Construction Cost Index††	July	126.6	124.4	119.6
BLS Consumer's Price Index	June	114.5	114.0	113.4
NEMA Insulation Materials Sales Index†	May	631	694	517
NEMA Electric Appliance Sales Index†	May	299	317	219
NEMA Household Refrig. Sales Index†	May	158	188	128
Metal Prices (Aug. 4)				
Copper, Conn. V., lb.		$ .28½-.30	$ .29¾	$ .24¼
Lead, N. Y., lb.		.14	.13½	.16
Zinc, prime Western E. St. Louis, lb.		.11	.11	.15
Tin, Straits, qual. N. Y. lb.		.78¼	.84¾	1.21½
Aluminum, ingot, base price		.21½	.20½	.19
Nickel, base price		.60	.60	.56½
Steel, billets, Pitts, ton		62.00	59.00	56.00
Steel, scrap, No. 1 heavy, Pitts., ton		44.00	41.00	45.00

*Preliminary **Revised †1936=100 ††1949=100 †††Unadjusted

Year-End Balance Sheet Class A&B Electric Co's

Assets	Millions of Dollars 1951	1952
Electric plant	$20,756	$22,967
Reserves	4,178	4,525
Plant*	16,579	18,442
Other plant	2,615	2,762
Reserves	557	581
Other plant*	2,059	2,182
Total plant	23,372	25,729
Reserves	4,734	5,106
Total plant*	18,637	20,624
Plant adjustments*	1	1
Investment in associated companies*	1,058	1,099
Other investments, funds*	176	156
Net investments	1,235	1,255
Cash and working funds	485	536
Special deposits	90	76
Temporary cash investments	419	433
Notes & accounts received*	533	589
Materials & supplies	717	741
Other current & accrued assets	62	67
Current & accrued assets	2,307	2,443
Unamortized debt discount & expense	92	84
Other deferred debits	93	95
Total deferred debits	184	179
Capital stock discount & expense	46	50
Reacquired securities	27	29
Assets & other debits	$22,438	$24,581

Liabilities	1951	1952
Common stock	$5,409	$5,867
Preferred stock	2,731	2,897
Premiums, assessments	399	465
Total stock	8,539	9,228
Capital surplus	326	523
Earned surplus	1,444	1,645
Total surplus	1,771	2,168
Stock & surplus	10,310	11,396
Bonds	9,367	10,369
Other long-term debt	627	441
Long-term debt	9,994	10,809
Notes & accounts payable	633	694
Customers' deposits	78	82
Accrued interest & taxes	1,029	1,172
Other liabilities	117	143
Current & accrued liabilities	1,857	2,090
Deferred credits	126	128
Reserves (except reserves deducted contra)	81	79
Contributions in aid of construction	70	78
Liabilities & other credits	$22,438	$24,581

Source: Federal Power Commission. * Less reserves.

FINANCIAL

'New Money' Bond Sales Set Record

Despite higher interest costs companies sold $343.4 million debt securities in 2nd quarter

Lower security prices, especially in the bond market, did not deter electric companies from obtaining funds required for the $3 billion expansion goal set for this year.

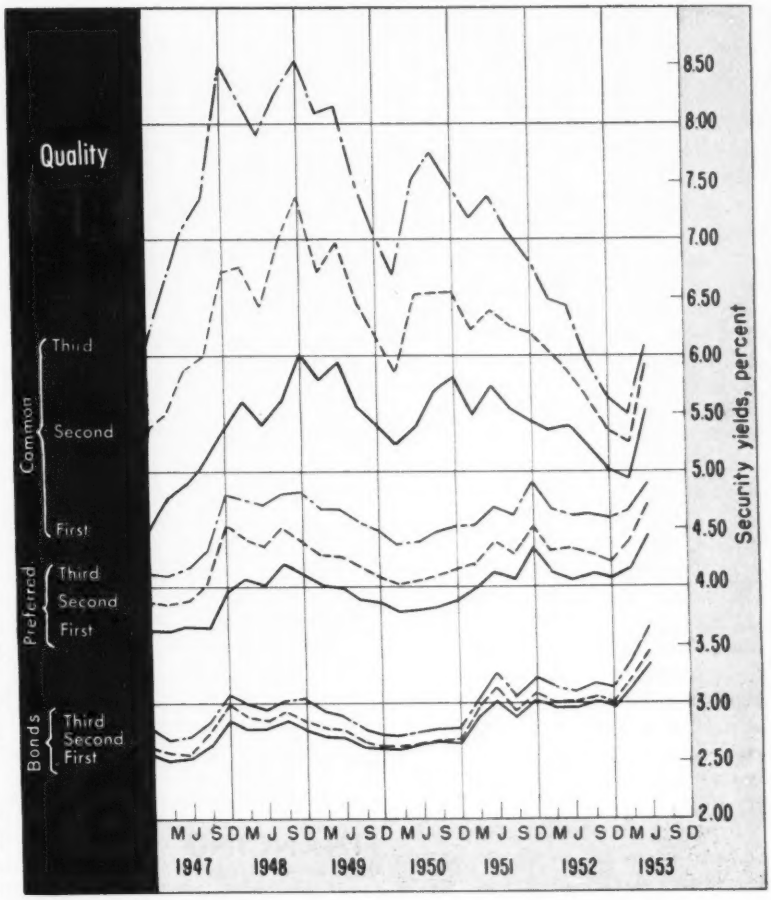
These companies sold publicly over a billion dollars of "new money" securities during the first six months of 1953, a figure slightly below the record set in the like period of 1952. Institutional buyers, such as insurance companies, trustees for pension funds, and savings banks, purchased privately almost $190 million in securities from electric companies, a figure only slightly below private sales during all of the year 1952.

A record $343.4 million in "new money" debt was sold publicly by the electric companies in the second quarter of 1953 when interest rates were the highest since the middle thirties. This exceeded the former high established in the like quarter of 1952 when $341.8 million was sold.

Spotlight on Bonds . . . The bond market held the spotlight. Following a gradual two-year downtrend in prices, a sharp drop occurred after the middle of April and continued into mid-June before support was found. At the end of March quarter, first quality bond yields as shown in the chart, stood at 3.15% as compared to 3.34% at the end of the June 1953 quarter.

On the demand side of the equation which determines prices, it may be noted that public flotations by private and municipal borrowers were at a higher level during the six months this year than during any other like period since 1926.

At the same time money markets remained short of loanable funds. Another factor aggravating the situation was the announcement on April 8 that the United States Treasury Department planned to raise $1 billion through the sale of 30-year 3¼% bonds and the same amount by increased issues of 91-day bills.



SECURITY YIELDS increased sharply as market prices of securities dipped in the second quarter of 1953. The largest upturn in yields appeared in all three grades of common stocks

Public Offering—Electric Utility Securities

(Thousands of Dollars)

	First Half of 1953			First Half of 1952		
	New Money	Other	Total	New Money	Other	Total
Bonds, Notes, and Debentures	543,200	2,000	545,200	637,559	.....	637,559
Preferred Stocks	142,499	6,135	148,634	107,868	.....	107,868
Common Stocks (a)	329,036	.....	329,036	329,586	5,601	335,187
Total	**1,014,735**	**8,135**	**1,022,870**	**1,075,013**	**5,601**	**1,080,614**
	First Quarter of 1953			**First Quarter of 1952**		
Bonds, Notes and Debentures	199,800	2,000	201,800	295,800	.....	295,800
Preferred Stocks	70,717	.....	70,717	60,983	.....	60,983
Common Stocks (a)	166,019	.....	166,019	80,347	5,601	85,948
Total	**436,536**	**2,000**	**438,536**	**437,130**	**5,601**	**442,731**
	Second Quarter of 1953			**Second Quarter of 1952**		
Bonds, Notes and Debentures	343,400	.....	343,400	341,759	.....	341,759
Preferred Stocks	71,782	6,135	77,917	46,885	.....	46,885
Common Stocks (a)	163,017	.....	163,017	249,239	.....	249,239
Total	**578,199**	**6,135**	**584,334**	**637,883**	.....	**637,883**

Source: Reis & Chandler, Inc.
Notes—Bonds are taken at principal amount and stocks at the price to the public. (a) Offerings to stockholders under subscription rights are included in same quarter as the date of stock record.

Fair Premium Expected . . . It was generally expected that these bonds would command a fair premium. It was not until April 22 when this issue was actively traded in that it was realized these highest grade bonds could not be sold for less than a rate of 3.25%. Until recently the new 3¼'s sold below par but presently are at a small premium. Unsold bond issues were marked down by the underwriters while the prices of bonds in the distributed market fell sharply as indicated in the Reis & Chandler yield chart.

On April 27 Detroit Edison Co opened bids on $40 million 35-year mortgage bonds and found that the interest cost would be 3.81% before expenses to the company. This issue was launched to the public on a hesitating and uncertain investment market at a price to yield 3.75%. These bonds were rated "Aa" by Moody's Investors Service.

Only a fortnight previous Texas Electric Service Co sold a mortgage issue with the same rating at a price bringing investors a return of 3.52%.

In January this year Detroit Edison Co found "institutional" purchasers willing to accept a 3.20% return for a 20-year mortgage issue. Philadelphia Electric Co's "Aaa" 30-year mortgage bonds of $30 million were sold in May at a price to yield 3.73% while the same company was able to attract investors with a 3.20% return in January 1952.

In May of this year a large syndicate of underwriters had to place a tag on Pacific Gas & Electric Co's mortgage bonds which provided a return of 3.90%. This compared with a yield of 3.28% on a comparable issue sold in March 1952 by the same company with a return of 2.77% in June 1950, during the "easy money" era.

Pessimism . . . Perhaps feeling that pessimism was becoming excessive, the Federal Reserve Board, which had chosen to hold to the sidelines as a watchful observer, returned to the market to buy Treasury bills during May and June. This move was followed by the easing of member bank cash reserves requirements. This change in central bank policy together with the attractive return afforded by high quality bonds brought investors back to the market and starting in late June bond prices firmed.

(*Continued on Page* 207)

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE 1953									
July 30	**3.27**	**3.33**	**3.52**	**4.32**	**4.50**	**4.77**	**5.41**	**5.70**	**5.87**
July 23	3.27	3.33	3.55	4.33	4.50	4.79	5.42	5.76	5.91
END OF QTR									
2nd 1953	3.34	3.46	3.64	4.47	4.70	4.88	5.52	5.93	6.10
1st 1953	3.15	3.23	3.39	4.16	4.41	4.66	4.95	5.24	5.50
4th 1952	2.99	3.03	3.14	4.06	4.22	4.59	4.98	5.33	5.62
3rd 1952	2.99	3.03	3.16	4.10	4.26	4.61	5.18	5.59	5.96

Data: Reis & Chandler, Inc.

EARNINGS

Company	Period Months Ended		Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
Arizona Public Service	12	June	$3,444,000	$2,782,000	$....	$....
Consolidated Edison of New York	12	June	49,856,424	41,496,451	2.97(a)	2.39(a)
Consolidated Gas EL&P of Baltimore	12	June	11,141,160	9,286,534	2.00(c)	1.66(c)
Gulf States Utilities	12	June	8,118,619	6,393,717	1.56(b)	1.30(b)
Middle South Utilities, consolidated	12	June	14,158,690	11,973,778	1.90(e)	1.87(e)
New Jersey Power & Light	12	June	1,240,962	1,392,018	....	....
Niagara Mohawk Power, consolidated	12	June	24,113,733	23,563,478	1.92(f)	2.06(f)
Northern Indiana Public Service	12	June	8,918,247	8,097,569	2.41(g)	2.26(g)
Oklahoma Gas & Electric	12	June	6,008,181	5,224,690	1.93(h)	1.80(h)
Portland General Electric	12	June	3,634,970	3,601,747	2.42(i)	2.74(i)
Public Service Co of Oklahoma	12	June	5,240,172	4,447,907	....	....
Shawinigan Water & Power	6	June	2,967,546	2,743,053	1.12	1.02
Southwestern Gas & Electric	12	June	3,922,313	3,524,807	....	....
Tampa Electric	12	June	2,569,883	1,894,948	3.57	2.86
Tucson Gas Electric Light & Power	12	June	1,501,908	1,087,302	2.75	2.02
Virginia Electric & Power	12	June	12,171,328	11,254,766	1.82	1.65
			1952	**1951**	**1952**	**1951**
Tacoma, Wash, City Light	12	Dec.	$2,000,699	$2,229,589	$....	$....

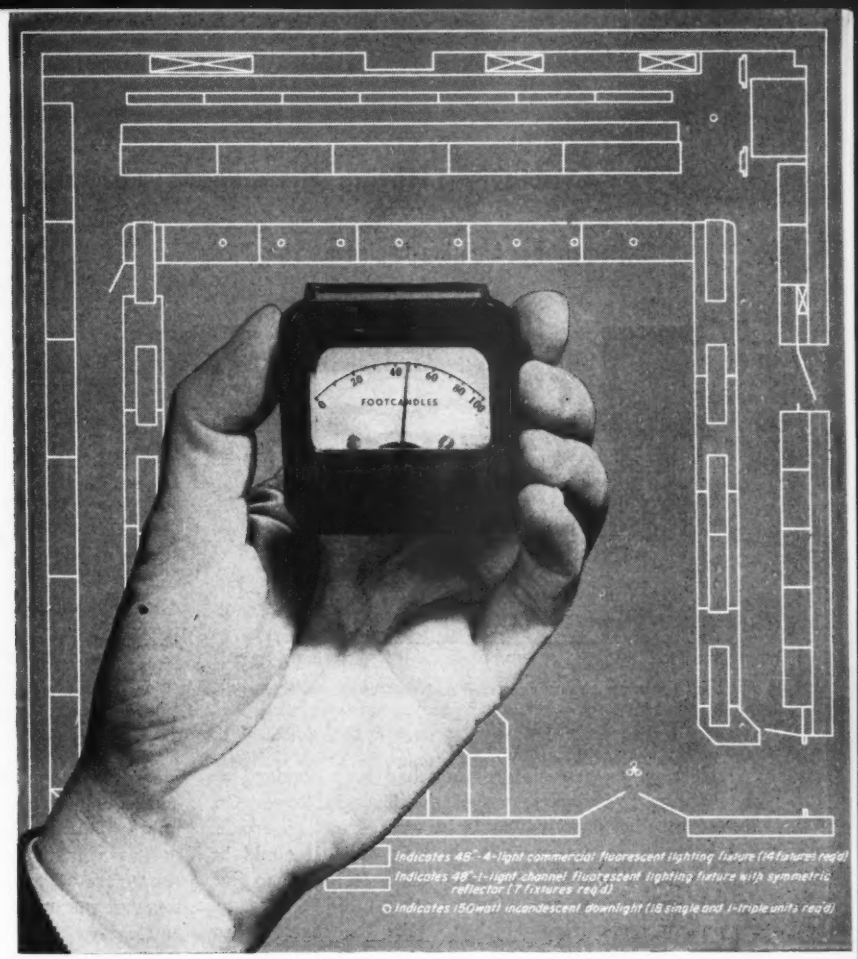
Notes—Figures for the last company have been audited. (a) Based on 13,581,863 shares in 1953 and 13,340,919 shares in 1952; (b) Based on 4,221,832 shares in 1953 and 3,905,210 shares in 1952; (c) Based on average shares outstanding during the period; (e) Based on 6,729,167 shares in 1953 and 6,200,000 shares in 1952 and excluding tax reduction due to Amortization of Emergency Facilities; (f) Based on 11,056,036 shares in 1953 and 10,056,036 shares in 1952; (g) Based on 3,121,554 shares in 1953 and 3,049,858 shares in 1952; (h) Based on 2,653,140 shares in 1953 and 2,411,945 shares in 1952; (i) Based on 1,500,000 shares in 1953 and 1,312,500 shares in 1952.

FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
SCHEDULE FOR AUGUST—SEPTEMBER—OCTOBER			
Bonds			**Bid Date**
Southern California Edison—1st mtg due 1978	$30,000	.....	Aug. 25
Wisconsin Power & Light—1st mtg due 1983	8,000	.....	Aug. 31
Duke Power—1st and refunding mtg due 1983	35,000	.....	Sept. 1
Louisiana Power & Light—1st mtg due 1983	12,000	.....	Sept. 15
Duquesne Light—1st mtg	12,000	.....	Sept. 22
Mississippi Power—1st mtg due 1983	4,000	.....	Oct. 6
Metropolitan Edison—1st mtg due 1983	8,000	.....	.....
Debentures			
Central Hudson Gas & Electric—conv debs	$6,000	.....	.....
Preferred Stock			
Duquesne Light—about 100,000 sh $50 par	$5,000(e)	.....	Sept. 17
Common Stock			
Duke Power—208,321 sh (to be offered commonholders on 1-for-20 basis record Sept. 2 to expire Sept. 18 without underwriting)	$6,250	$30.00	5.00%
Duquesne Light—about 150,000 sh	.....	.....	Sept. 15
Central Hudson Gas & Electric—140,000 sh (to be offered commonholders on 1-for-15 basis)	.....	.....	.....
New England Gas & Electric—about 194,916 sh (to be offered commonholders on 1-for-10 basis, record about Sept. 30)	.....	.....	.....
Hartford Electric Light—105,500 sh	.....	.....	.....
POSTPONED, UNSCHEDULED, AND/OR UNDER CONSIDERATION			
Bonds			
Eastern Utilities Associates—collateral trust	$7,000	.....	.....
Monongahela Power—1st mtg	10,000	.....	.....
Public Service Electric & Gas—1st mtg due 1983	50,000	.....	.....
Kansas Gas & Electric—1st mtg due 1983	10,000	.....	.....
Indiana & Michigan Electric—1st mtg	15,000	.....	.....
Preferred Stock			
Kansas Gas & Electric	$5,000	.....	.....
Indiana & Michigan Electric	5,000(e)	.....	.....

Notes—(a) To sell enough common stock to yield $6 million; (e) Estimated.

Kinds of sales organization and methods of operation with which utilities face the job of relighting are detailed


FOOTCANDLES
Indicates 48"-4-light commercial fluorescent lighting fixture (14 fixtures req'd)
Indicates 48"-1-light channel fluorescent lighting fixture with symmetric reflector (7 fixtures req'd)
Indicates 150-watt incandescent downlight (18 single and 1-triple units req'd)

Here's How Utilities Are Selling Commercial and Industrial Lighting

Most electric utilities think they are doing a pretty good job in promotion and sale of commercial and industrial lighting. That is, most of the utilities replying in the survey reported here say so, in effect, in their answers to general questions. But the answers to more specific questions do not always appear to support that thought.

With about 85% of the lighting in the industrial and commercial establishments in this country below, much of it far below, the levels of quantity and quality recommended as minimums of good modern practice by the Illuminating Engineering Society—

With action in this situation now being taken by the concerned section of the National Electrical Manufacturers Association in setting up a National Lighting Bureau to promote the relighting of these business places—

With the chairman of the Edison Electric Institute Commercial Lighting Committee at the general sales conference of the institute last spring strongly urging utilities to increase their sales effort in relighting in order to maintain the rate of revenue growth in this customer class—

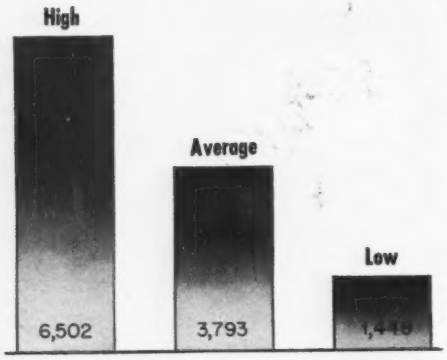
Naturally, therefore, commercial and industrial relighting is the theme of Electrical World's annual lighting issue this year.

The presentation is in two parts. One consists of numerous pictures and descriptions of relighting installations supplied by utility men as examples, not especially of outstanding or spectacular solutions of difficult illumination problems, but of the results that come from day-to-day selling.

The other part is the report of a survey of utility organizations and operations in commercial and industrial lighting sales. They will be expected to do their part in the big relighting job ahead.

This survey is different from any previously made by Electrical World. A check list was concluded to be the easiest way to elicit the desired information. But where to get the material with which to build the check list? And there it was, right at hand.

Table I—Lighting Handled as a Separate Sales Operation



Co.	Lighting Engineers	Ind. & Com. Customers	Customers per Engineer
1	24	65,597	2,733
2	3	6,517	2,172
3	5	14,900	2,980
5	4	14,588	3,647
6	24	34,693	1,446
7	6	26,481	4,414
8	13	36,974	2,844
9	1	4,400	4,400
10	3	17,921	5,974
12	5	9,256	1,851
14	5	28,856	5,771
16	9	22,560	2,284
18	14	72,350	5,168
19	22	88,019	4,001
20	7	35,816	5,117
21	25.5	165,850	6,502
25	8	21,290	2,661
28	9	46,600	5,177
29	38	113,001	2,973
33	5	31,626	6,325
Averages	11.3	42,865	3,793

Earlier in the year, information had been obtained on the lighting sales operations of the Georgia Power Co. It was intended that this would be worked into an article. But it could be put to nobler use as well. It could be made to serve as a sort of bench mark on which to line up the lighting sales operations of other utilities. It was a convenient mine from which to take the material for building the check list.

In the various tabulations contained in the survey report, replying utilities are designated by numbers. The first is Georgia Power because it is the bench mark. The others are not identified but each utility included should be able to single out its own reply for comparison with others.

The article that otherwise would have been written about the Georgia Power operations is woven into report of the survey. It is partially incorporated into the discussion of replies because its data are actually a reply. And it appears partially as supplementary text enclosed in parentheses.

As the check list items are quoted almost verbatim from the Georgia Power material, they do not always state accurately the corresponding condition or activity of the replying utility, making it difficult for "yes" or "no" answers to be made on some points. The replier might be doing the same thing in a different way. Also, and undoubtedly, some utilities must have found the check list deficient in that it did not cover all of their activities and their replies do not give a complete picture of what they are doing in lighting promotion.

This condition is summed up in a comment included in the reply from the Florida Power Corp:

"Every utility has its own methods for handling the promotional phases of its business. The conditions surrounding each company are different. From our standpoint our type of operation is well suited to our particular problems, and, in respect to results, we think that ours will stand comparison with those of any utility in the country."

Because of these differences in surrounding conditions, the survey form did not ask for any information on results obtained from lighting promotion activities. The impossibility of judging the effectiveness and productivity of one way of such promotion as against another was recognized. The single purpose of the survey was to bring together the details of promotion and sale of commercial and industrial lighting so that those engaged in this work might see what others are doing in the same line.

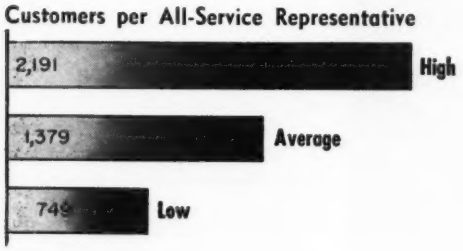
After the data here presented were compiled replies were received from five more utilities. These additional replies bring the total of commercial and industrial customers represented in the survey response up to about 1.4 million. Only one half of the sales executives on Electrical World's mailing list were covered in the survey; the others were asked for the examples of relighting installations which are pictured in the following pages. The utilities to whom the survey form was sent have about 2.9 million commercial and industrial customers. Thus it may be said from the response that utilities serving approximately one half of those customers are sufficiently concerned about relighting those premises to take the trouble of filling out a rather detailed questionnaire on the subject.

Organization and Personnel

Survey replies indicate two manners of approach to commercial and industrial lighting sales. On the one hand is the lighting division set up and operated as such with full-time personnel working in that specific field and giving only incidental attention to other matters. On the other hand is the organization in which lighting is handled along with other sales functions by "all-service" sales representatives.

There is no distinct dividing line between the two manners of operation. The "all-service" organization may, and often does, include one or more competent lighting engineers whose technical knowlege is available for the handling of the more difficult lighting problems that arise.

Table II — Lighting Handled by All-Service Representatives



Co.	Representatives	Ind. & Com. Customers	Customers per Representative
11	23	50,400	2,191
15	13	14,169	1,090
17	19	35,050	1,845
23	14	27,167	1,941
24	37	27,730	749
26	49	46,862	956
27	7	15,317	2,188
31	11	22,339	2,031
32	11	14,615	1,329
Averages	20	28,183	1,379

As best could be done from the information in them, the 33 survey returns—five more were received too late to be included in the compilation—were grouped according to the two manners of lighting sales operation. Into one group, that of utilities handling lighting as a separate operation, fell 20 of the replies, as shown in Table I and accompanying graph. In this group the number of customers per full-time lighting engineer varies from 1,466 up to 6,502, with an average of 3,793.

The remaining 13 replies were taken as representing utilities that handle lighting sales as part of the work of all-service representatives. However, only nine of these replies contained figures from which customers per representative could be calculated. Table II and graph of the nine show a high of 2,191 customers per representative, a low of 749, and an average of 1,379.

No conclusion as to the effectiveness of the one or the other manner of handling lighting sales can be arrived at by comparison of the two sets of data. It might be inferred from the fact of 20 replies in one group as against 13 in the other that the first manner of operation is the better, about 60% favoring it. This is not a very firm inference because the separation of replies into the two groups could not be definite.

Of the 13 utilities that do not handle lighting as a separate sales activity, only 5 have full-time lighting engineers—3 have one each and 2 have 2 each. The remaining 8, that have no full-time lighting men, serve a total of 214,913 industrial and commercial customers.

Specialization in particular fields of lighting is not frequent, according to the survey replies. Only 4 of them indicated full-time specialists—Kansas City Power & Light with 2 on industrial; one on school, church and sports, and one on office and store lighting; Georgia Power with one each on industrial, school, and architectural lighting; Dayton Power & Light and Cincinnati Gas & Electric with one each on industrial lighting.

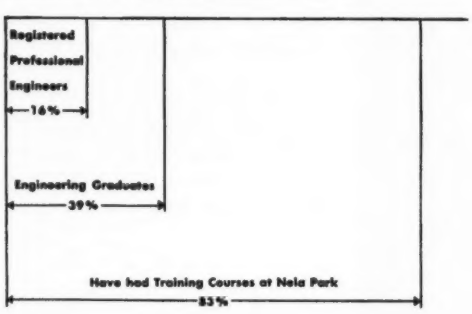
From 27 of the 33 replies information was obtainable in respect to the educational and professional backgrounds of personnel engaged in the sale of commercial and industrial lighting. The total number so reported is 499, this including management and supervisory personnel as well as full- and part-time field men. Of this number 196 (39%) have engineering degrees, 79 (16%) are registered professional engineers, 417 (83%) have had training courses at Nela Park. See Table III and graph.

(In the general office of the bench-mark company are the manager of the lighting division, the industrial, school and architectural lighting specialists, and a staff engineer. Reporting directly to the manager are the 6 division lighting engineers under whom are the division field men—5 in one division, 3 in another, 2 in a third, and one each in the remaining three.)

Table III—Quality of Personnel

Co.	In Ltg Sales	Eng Deg	Reg Eng.	Nela P
1	24	18	8	24
2	3	—	—	3
3	5	2	1	5
5	6	2	—	4
6	26	—	—	24
7	6	—	—	6
8	13	5	8	13
10	3	1	—	3
11	23	18	—	22
12	5	3	1	5
14	5	4	2	5
15	14	4	2	9
16	17	9	1	—
17	20	16	4	2
18	14	4	4	14
19	26	11	3	26
20	24	13	17	14
21	26	26	6	26
23	15	—	—	14
24	44	18	—	26
25	9	—	—	9
26	53	28	17	51
27	7	—	—	7
28	63	—	—	63
29	38	1	1	31
31	15	12	3	8
33	5	2	1	3
Totals	499	196	79	417

Personnel in Lighting Sales—100%



Selling the Relighting Market

Department Store

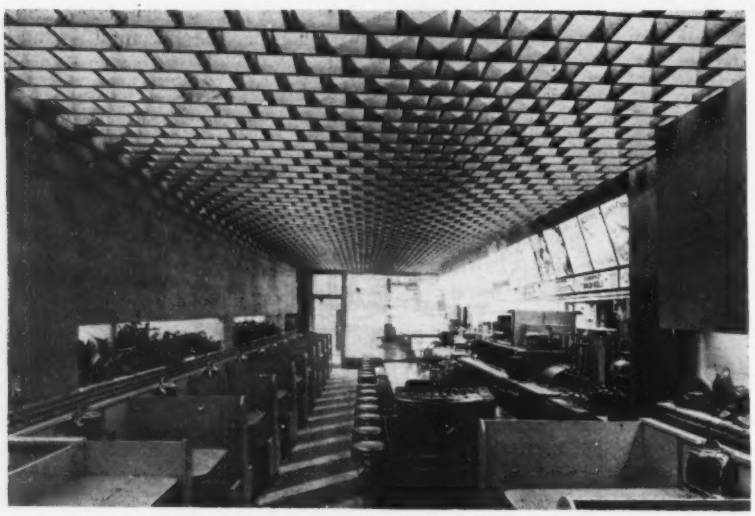
Color correction is of utmost importance in department store rug displays. Here, 50 ft-c of general illumination is provided by 96-in. T-12 standard cool white tubes in two-lamp louvered fixtures. The incandescent color of home lighting is spilled on the rugs by 150-w reflector floods which step up the intensity to 75 ft-c.

James B. McNall
West Penn Power Co

Drive-In Restaurant

Stanley's Drive-In, Amarillo, Texas, is attracting business with "good food, lots of plate glass, and plenty of light." Outside lighting consists of 23 150-w recessed floodlamp units and a twinkle bulb sign on top. Inside lighting has 16 48-in. recessed fluorescent units with glass bottoms, providing 50 ft-c illumination.

Thomas Hart
Southwestern Public Service Co



Restaurant

Unusual effect is produced by two rows of two-lamp 40-w fluorescent strip lights shining through false ceiling of natural finish redwood cells. Indifferent appetites are toned up by fluorescent illumined greenery near booths. Behind gaily colored glass panels are 40-w strip lights which also brighten back bar.

George H. Maier
Dayton Power & Light Co

Today's Sales Job

Bank

Varnished surfaces of paintings on the ceiling of a bank in Williamsport, Pa., posed a problem in relighting. It was solved by installation of six 40-w fluorescent lamps per painting about 4 ft from the ceiling. Average illumination provided along tellers' cages is 45 ft-c.

M. M. Brown
Pennsylvania Power & Light Co

Used Car Lot

To get highlights on the first row of cars at a used car lot in Providence, R. I., 10 PAR-38 150-w spots and floodlamps were mounted on 25-ft steel poles, each also having a floodlight with medium beam auxiliary reflector with a 1,500-w lamp. This resulted in 35 ft-c illumination on front row and 10 ft-c elsewhere.

E. J. Broderick
Narragansett Electric Co

Hardware Store

New installation increased general illumination to an average of 75 ft-c under the newly-created mezzanine floor at this hardware and furniture store in LaGrande, Ore. Throughout the remainder of the ground floor new lighting has raised average level of illumination to 45 ft-c.

E. A. Hanson
California-Pacific Utilities Co

Selling the Relighting Market

Beauty Shop

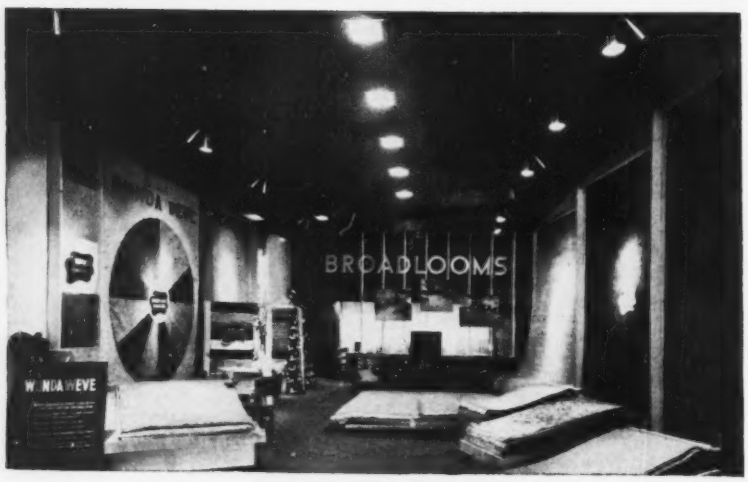
Beauty care is easy and accurate under the natural light conditions in this hairstyling specialty shop. All types of hair color and skin make-up are properly rendered by the deluxe cool white fluorescents in shielded units. The irregular placement of the fixtures puts 50 ft-c in the work area while holding intensities to 30 ft-c for customers who must spend some time sitting under the hair dryers.

C. J. Bunce
Bureau of Home Appliances of San Diego

Gourmet Shop

Impulse buying determined the lighting design for this specialty department of a hardware and furniture store in Marion, Ill. An open-top canopy, 4-ft wide, was built all around the room, 8 ft above the floor. Hung from the ceiling inside and above the canopy are 150-w R-40 floodlights. Floor displays are highlighted by PAR-38, 150-w floods. Under the canopy are strips of warm white fluorescent.

E. O. Humphrey
Central Illinois Public Service Co



Broadloom Salon

To make merchandise appear as it does at home, 300-w downlights were installed 5 ft 6 in. apart to provide an average level of 25 ft-c at a broadloom store in Vancouver, B. C. Highlighting was accomplished by 150-w spotlights, while single and double cluster units, mounted on 24-in. hangers, provide 70 ft-c on vertical and horizontal carpet displays.

W. J. Gray
B. C. Electric Co, Ltd

Today's Sales Job

Jewelry Store

Glittering silver and sparkling gems make this store a delightful showplace. Bath of light comes from louvered recessed PAR-38 floods in gimbals above the aisle side of show cases. Down the center aisles are four-tube louvered fluorescent fixtures with luminous sides. In addition to 100 ft-c on top of the show cases, special displays get more than 500 ft-c from spots substituted for the floods in the gimbaled fixtures.

Glenn A. Grier
Dayton Power and Light Co

Used Car Lot

Reconditioned cars in this lot pick up brilliant sheen under 50 ft-c incandescent shower from pole mounted floods. Each 35-ft pole carries three 25 deg narrow beam and three 31 deg wide beam 1500-w floodlights. No wires or fixtures mar appearance of showroom building, front of which is enhanced by reflected spill light.

William Roll
West Penn Power Co

Clothing Store

Spacious high ceiling effect was preserved in this store by continuous row 8-ft slimline fluorescent providing 60 ft-c intensities. Alcove-valance lighting is from single strips. Merchandise in the front of the store is highlighted with R-40 spotlights.

James W. Armour
Lowell Electric Light Corp

Table IV—Non-Utility Personnel With Whom Lighting Men Co-operate

Company	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	Totals
Representatives of Fixture Mfrs.	75	6	15	5	7	15	20	25	6	10	35	50	6	30	15	26	12	100	86	50	75		26	70	30	60	25	31	60	200*	33	10	15	1,049
Architects	116	4	20	12	14	51	45		3	5	72	63	8	20	22	26	10	130	73	81	140		44	40	18	58	15	110	221	700*	81	11	55	1,368
Consulting Engineers	20	2	6		4	8	7		3	1	12	5		6	5	4	3	30	35	20	24		4	20	5	15	2	10	25	43	13	5	8	345
Elec. Dist'r Lt'g Specialists	18	4	5	10	6	4	3	7		1		6	4	4	1	3	2	3	22	10	61		16	10	8	52		37	10	12	15	1	9	344
Lamp Co Engineers	4	3	5	2	4	3	3	1	3	2	4	5	2	4	3	3	5	15	5	3	8		4	4	3	15	6	3	7	6	4		2	141
Employees of Elec. Contractors	25	9	40		125	96	10	20	26	7	10	40	8	16	10	11	3	20		80	124		60	20	45	119	40	157	151	5,370*	35		12	1,319
Municipal Employees	12	1	1		90	7	54	6	2			13		15	5			80		6	275			20		15	8	220	257	650*	90		15	1,192

*These figures not included in totals because so far out of line with others.

Cooperation with Local Interests

It is evident from the replies that utilities are keenly alive to the value of working with others who have stakes in the promotion of modern lighting. All of the replies indicated such cooperation, but one did not say how many such contacts were maintained. Another reported certain figures far out of line with the rest. The other 31 reported keeping in touch and working with totals of 1,049 representatives of fixture makers, 1,568 architects, 345 consulting engineers, 344 electrical distributor lighting men, 141 lamp company engineers, 1,319 employees of electrical contractors, and 1,192 municipal and state employees and school officials, a grand total of 5,958. (Table IV)

These figures indicate the size and range of the interests with which utilities cooperate in lighting sales activities, but they are not particularly significant of themselves. Of more significance is the total of 5,492 such contacts reported in the 27 replies that supplied information on numbers of men engaged in lighting sales. Set off against the 499 men so reported, the total of 5,492 says that the average utility lighting man is working with about 11 others outside.

(This year the bench-mark utility is conducting a personal contact survey among architects to learn in each case (1) who does their electrical and lighting layout work, (2) what help the utility can give, (3) if a catalog file of lighting equipment is kept, and (4) if a technical file of lighting information is maintained. Architects will be encouraged to place their electrical design work with professional engineers who are well-versed in lighting design and adequate wiring requirements. Engineers retained by architects are receiving special attention. They are furnished with the latest technical information and up-to-date equipment catalogs. Also a survey is being made among electrical contractors to find out how much lighting they are installing that was not designed by an engineer.)

All of the 32 responsive replies give figures on contacts with representatives of fixture manufacturers and all but one on contacts with architects. Figures on consulting engineers and employees of electrical contractors are missing from 3 replies and on lighting specialists of electrical distributors and lamp company engineers from 2.

The wide range in numbers of contacts with municipal employees is evidently the result of various understandings of what was meant by the term. Apparently it was taken to include school officials in some replies and not in others. One suspects, in examining Table IV, that some replies reported the numbers of various outside personnel with whom utility lighting men should co-operate rather than those with whom actually they do work, calling on them frequently.

Training Program

Only 3 of the 33 replies did not report training programs. Training for new employees in lighting work was reported by 29 and for personnel of architects, engineers,

Table V—Coverages of Training Courses

Company	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	Totals
For new employees	X	X	X		X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	28
Non-utility personnel	X	X	X		X		X	X		X		X		X	X	X		X		X	X		X		X		X	X	X		X	X	X	21
Covers basic electricity	X				X	X	X		X	X	X	X		X		X				X			X	X		X	X	X	X	X	X	X		19
Illumination fundamentals	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	30
Illumination methods	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	30
Illumination applications	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	30
Wiring design	X					X	X		X	X	X	X		X	X	X					X			X	X		X		X	X	X		X	18
Office practice	X	X			X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X		X	X	X		X	X	27
Lighting salesmanship	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	29
Field experience	X	X	X		X	X	X	X	X		X	X		X	X	X	X		X	X	X	X	X			X		X	X	X	X	X	X	26

Outline of Lighting Sales Training Program

First, the trainees are given an introductory lecture in which are discussed (1) the lighting profession and what it offers, (2) the job of the utility lighting engineer, (3) the organization of the Georgia Power Company, and (4) the professional societies, organizations and institutes in the lighting field. Then comes the instruction schedule, which requires a minimum of eight weeks for completion, as follows:

I. Basic Electricity—(2 days). A 10-unit strip film course covering

1. Magnetism
2. Static Electricity
3. Current Electricity
4. The Storage Battery
5. Electro-magnetism
6. The Generator
7. Alternating Currents
8. Electric Motors
9. Electric Meters
10. Applications

II. Illumination Fundamentals—(3 days). A strip film and sound course supplemented by lectures and demonstrations.

1. The Mechanism of the Human Eye
2. Light and Vision
3. Illumination Terminology
4. The Quantity Requirements of Good Illumination
5. The Quality Requirements of Good Illumination
6. The Importance of Color in Lighting

III. Illumination Methods — (11 days). The "heart" of the lighting course presented by strip, films, movies, lectures, demonstrations and problem work. Tours are made to view actual lighting installations, and fixtures are examined in the jobbers' demonstration rooms.

1. The Incandescent Lamp
2. Electric Discharge Lamps
3. Fluorescent Lamps
4. Fluorescent Auxiliaries
5. Cold Cathode Sources
6. Principles of Light Control
7. Systems of Light Control
8. Calculation of Interior Illumination

IV. Illumination Applications—(7 days). How the methods learned in Part III are put to practical use, presented by strip films, lectures and visits to actual installations.

1. Office Lighting
2. School Lighting
3. Store Lighting
4. Industrial Lighting
5. Flood Lighting
6. Theatre Lighting
7. Church Lighting
8. Cost and Maintenance of Lighting

V. Wiring Design—(2 days). A lecture and problem-work course of good practices in designing wiring systems.

1. The National Electric Code
2. Interior Wiring
3. Service Entrance and Metering Equipment
4. Panelboards and Circuit-Breakers

VI. Office Practice—(5 days)

1. Drafting
2. Lettering
3. Symbols Used on Lighting Layouts
4. Commercial and Industrial Rates
5. Lighting Report Forms

VII. Lighting Salesmanship — (5 days). The principles of lighting salesmanship as presented in the eight volumes of the G. E. LaSalle Institute training course.

VIII. Practical Experience—(5 days) A week spent in the field in the company of an experienced lighting engineer to observe the methods of applying the knowledge gained in the training course.

contractors and others concerned with lighting by 21. Subjects covered (Table V) are:

Illumination fundamentals—vision, terminology, etc—in 30 programs.

Illumination methods—light sources, control, calculation, etc—in 30.

Illumination applications—stores, offices, schools, industrial plants, etc—in 30.

Lighting salesmanship in 29.

Office practice—drafting, symbols, rates, report forms, etc—in 27.

At least a week in the field with an experienced engineer—one reply said 6 weeks, another, 6 months—in 26.

Basic electricity in 19.

Wiring design—Codes, wiring methods, services, panel boards, etc—in 18.

(The training program of our bench-mark utility is detailed in an accompanying panel. It requires a minimum of 8 weeks for men having the qualifications in education and experience necessary to comprehend its teaching. Through the course trainees are supplied with reference material in the form of catalogs, pamphlets, etc, so that upon completion an adequate library has been acquired for use in work later.)

Reporting Lighting Sales Work

Of the 33 survey replies, only 2 contained no information on routine reporting of work done. One of these, from a utility with 10,493 commercial and industrial customers, was accompanied by an explanatory letter. In this company the general commercial manager does practically all of the lighting work because he has been unable to find men to fill the two lighting engineer positions he has open. Evidently he does not have a great deal of time for making out reports to himself.

The other unresponsive reply is from a very large utility which, judging from information supplied on other subjects in the survey questionnaire, is well organized for lighting sales. It is not conceivable that this company does not have some routine of lighting sales reporting.

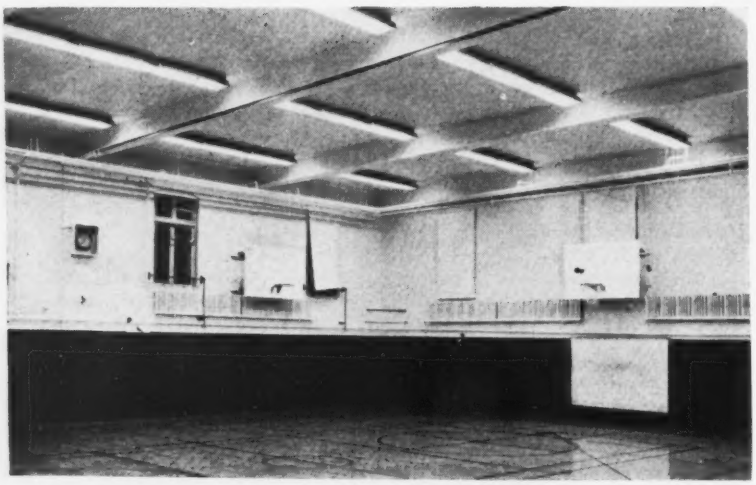
Because of differences between utilities in size, extent

Selling the Relighting Market

Women's Wear Shop

Soft, warm colors light high-style merchandise in this fashionable shop. Once three connected stores, the shop is integrated by 70 ft-c direct downlighting. Principal fixtures are 4 ft sq Plexiglas covered troffers containing 10 deluxe warm fluorescents. Recessed spotlamps and 300-w lensplate units put glitter on dress trimmings and impulse items.

William C. Hoch, Jr.
Philadelphia Electric Co



Gymnasium

Evenly distributed lighting eliminated hazardous dark corners and hot spots in this gymnasium. The entire playing floor gets 30 ft-c from fluorescents in continuous rows broken only by ceiling beams. Mesh lamp guards are used for protection against balls in play. For operating economy, alternate switching of fixtures is provided. The flexible distribution has proved particularly applicable on cloudy days.

H. M. Dennison
Pennsylvania Power & Light Co

Appliance Store

Flexible lighting keeps up with these frequently changed appliance displays. Continuous row of 4-tube 48-in. fluorescents puts 65 ft-c down 15-ft width of store. Between each fixture is a 150-w PAR spot that is adjustable within 90 deg. It provides 90 ft-c highlighting for "features."

Howard J. Kreitzberger
Pennsylvania Power & Light Co.

Today's Sales Job

Dress Shop

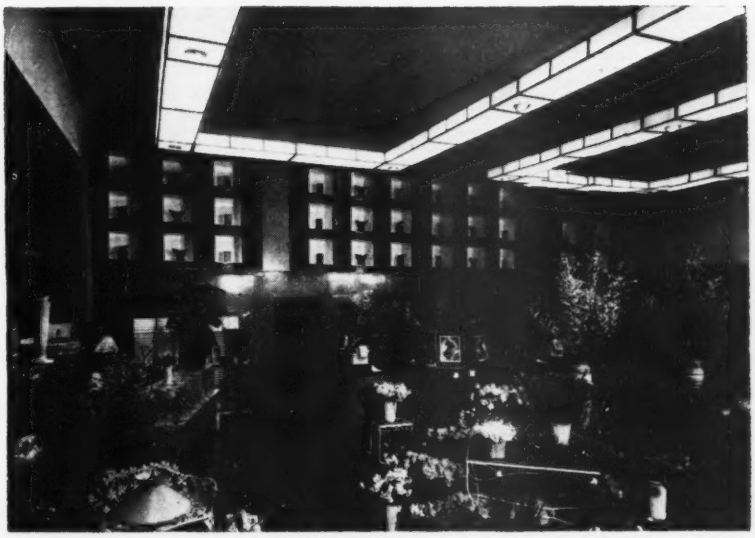
To overcome the disadvantage of an off main shopping area location, clusters of floodlights on flexible stems, hooded to prevent glare and twisted together to form a pattern, were installed at a dress shop in Baltimore. Lights were adjusted so that they splash against balcony faces and show and wall cases, creating the illusion that all displays stand alone.

E. R. White
Consolidated Gas Electric Light & Power Co

Florist Shop

To overcome light-absorbing wall colors, 40 deluxe cool white fluorescent lamps in 10 4-lamp luminaires with reflectors in U-shaped continuous rows, and 6 module units with PAR 38 spots between each two units were installed in a florist shop in Vancouver, B. C. Light intensity is 55 ft-c. Show windows are lighted by 6 200-w "attraction zone" mirrored reflectors and 2 40-w fluorescents.

A. H. Cocking
B. C. Electric Co, Ltd

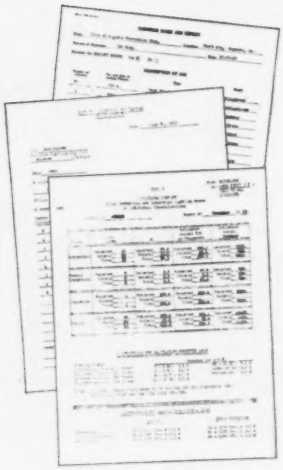


Automobile Sales Room

In the rear of this automobile sales building in Providence, R. I., is a louvered ceiling with 11 rows of T-12 lamps providing 55 ft-c. Louvered light boxes with T-12 lamps are centered in ceiling panels in the front area. Intensity is 80 ft-c. Cars are highlighted with R-40 hooded spots.

E. J. Broderick
Narragansett Electric Co

Table VI—Georgia Power Report of Planned Lighting Layouts—1952



Type of Layout	Atlanta	Athens	Augusta	Columbus	Macon	Rome	Gen. Off.	Total
Schools	3	6	3	48	14	13	14	101
Churches	22	11	10	7	15	14	13	92
Retail Stores	54	41	38	54	46	39	6	278
Retail Industrial	22	1	8	15	2	61	1	110
Wholesale Ind.	1	1	0	5	3	2	4	16
Street Lighting	8	8	3	10	1	2	2	34
Outside Flood Ltg.	12	5	3	8	9	2	2	41
Offices	58	17	21	51	22	15	6	190
Outdoor Sports	2	0	4	4	5	13	0	28
Misc. (non Ltg.)	0	22	10	154	1	5	24	216
Total	182	112	100	356	118	166	72	1,106
No. Above Done for Archt.	0	0	31	38	16	10	48	143
Layouts Per Man	(6)30.3	(2)56	(2)50	(3)118.66	(2)59	(2)83	(2)36	(19)58.2
Layouts/Man/Month	2.52	4.67	4.17	9.89	4.92	6.92	3	4.85
Total (Ltg. Layouts Only)	182	90	90	202	117	161	48	890
Layouts/Man (Ltg. Only)	30.3	45	45	67.33	58.5	80.5	24	46.84
Layouts/Man/Month (Ltg. Only)	2.52	3.75	3.75	5.61	4.88	6.7	2	3.93

Table VII.—Georgia Power Report of New Lighting Business in Month of December, 1952 and Year 1952

Residential, Commercial, Industrial and Street Lighting	No. Cust.	Kw Demand	Estimated Annual Kwh In thousands	Estimated Annual Revenue
By Classification of Load				
Current Month				
Residential	768	169.3	84.5	$1,690
Commercial	315	1,900.2	3,664.2	78,618
Retail Industrial	33	103.1	288.5	5,228
Wholesale Industrial	14	506.4	1,455.6	14,256
Street Lighting	47	62.5	250.9	6,257
Total This Month	1,177	2,741.5	5,743.7	$106,049
Year to Date				
Residential	7,118	1,544.7	770.4	$15,408
Commercial	3,932	16,681.5	39,391.9	808,282
Retail Industrial	460	1,540.4	4,011.4	86,536
Wholesale Industrial	222	4,629.8	18,451.0	183,848
Street Lighting	879	1,001.1	4,374.6	96,078
Total Year to Date	12,611	25,379.5	66,999.3	$1,190,152
By Divisions				
Current Month				
Atlanta	199	973.9	2,642.6	$48,017
Athens	167	437.2	843.4	12,442
Augusta	172	183.8	355.6	9,715
Columbus	182	318.7	565.8	13,015
Macon	138	319.2	896.7	12,843
Rome	319	508.7	439.6	10,017
Total This Month	1,177	2,741.5	5,743.7	$106,049
Year to Date				
Atlanta	2,629	9,139.2	27,032.7	$501,294
Athens	1,649	2,633.5	7,107.8	106,085
Augusta	1,934	2,424.1	4,031.2	106,644
Columbus	1,837	3,910.8	11,602.0	172,382
Macon	1,715	3,573.7	9,947.3	152,021
Rome	2,847	3,716.2	7,278.2	151,726
Total Year to Date	12,611	25,397.5	66,999.3	$1,190,152
Total Same Period Last Year	16,358	28,913.7	62,707.4	$1,361,059

Note: New business includes the lighting loads of new customers, and also net additions to present loads of existing customers.

of areas served, and sales department set-up, it is difficult, practically impossible, to classify the replies in comparative terms of good, fair, and poor routines for reporting lighting sales work. However, the general impression gained from study of the replies is that more than a few utilities could improve their methods of keeping track of this work.

Annual, in one case quarterly, summaries of the performance in lighting sales of engineers and representatives are made by about half of the replying utilities, 16 of 33. (The way this is done by the bench-mark utility is shown in Table VI.) One reply notes inclusion of load added and EAR in the annual summary.

Reports from field men as jobs are completed or in weekly or monthly statements of work progress are noted in 22 (67%) of the replies. Monthly reports on new lighting business, numbers of jobs, load added, estimated energy use and EAR are made by 23 (70%) of the replying utilities.

(The form used in the bench-mark utility for individual job reports provides spaces for name, address and nature of business of the customer; for numbers, lamps, descriptions, and makers' names of fixtures; and for notations of customer class, added load, estimated energy usage, and EAR. From each division of the company monthly report is made of new lighting business in load added, estimated energy usage, and EAR by customer classes and in designations of installations as those resulting from work of company men and those in which they had no part. The lighting division makes monthly report of new business for the whole company to the head of the sales department as shown in the adjacent Table VII.)

Comprehensive reporting of activities is done by 7 of the replying utilities, a little less compre-

Selling the Relighting Market

Jewelry Store

So pleased with this job in his La Jolla, Calif., store, the owner immediately had his Escondido place relighted. General illumination is 100 ft-c from 6 T-12 4-lamp, 8-ft fluorescent lamps in shielded fixtures. To eliminate image or hot spots on the glass of the cases, the 38 R-40, 150-w incandescent torpedo units are positioned 9 in. in front of the cases. Set on 24-in. centers, they sparkle the merchandise with 190 ft-c.

David F. Curtis
San Diego Gas & Electric Co

Laundry Front

Approximately 35 ft-c across the entire front of this establishment is provided by clusters of PAR-38 150-w flood lamps in brackets extending out 4 ft from building. With this arrangement each lamp could be set to contribute its share to complete coverage of the building front, holding spill light on sidewalk and adjacent buildings to a minimum.

W. B. Evans
Georgia Power Co

Used Car Lot

General illumination of 25 ft-c on this used car lot is provided by 18 wide-beam, open-type, 1,500-w floodlights mounted in pairs on poles, 24 ft above the ground. For punch lighting on featured cars, there are 12 300-w spotlights bunched in fours, 12 ft high.

S. H. Nothacker
New Orleans Public Service, Inc

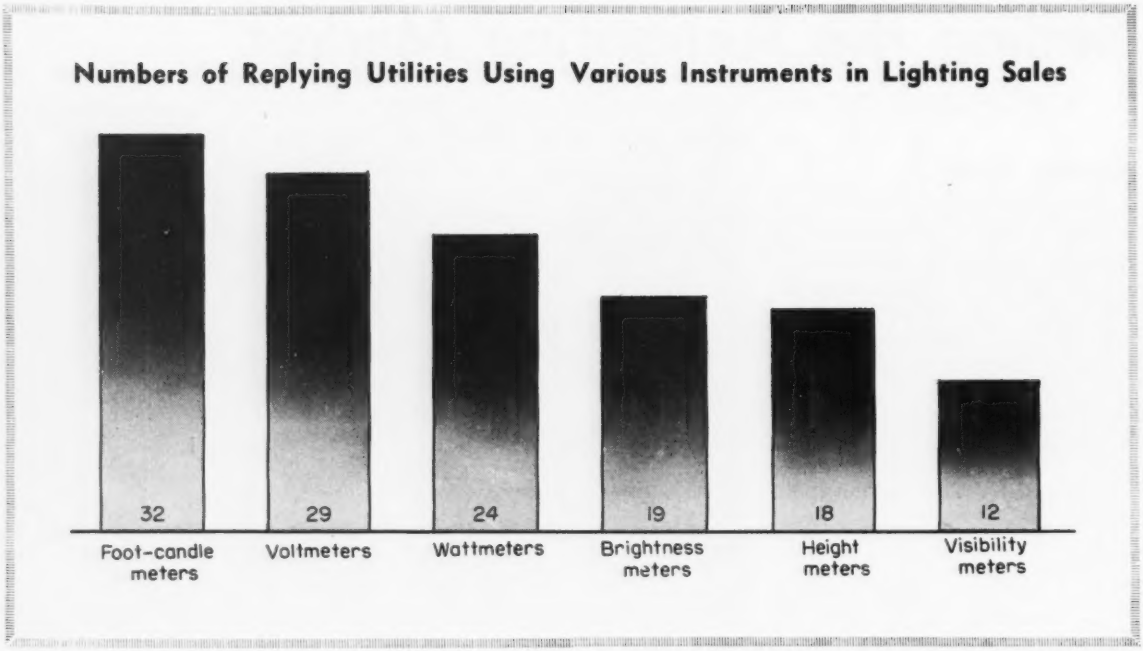


Table VIII.—Instruments Used by Lighting Field Men

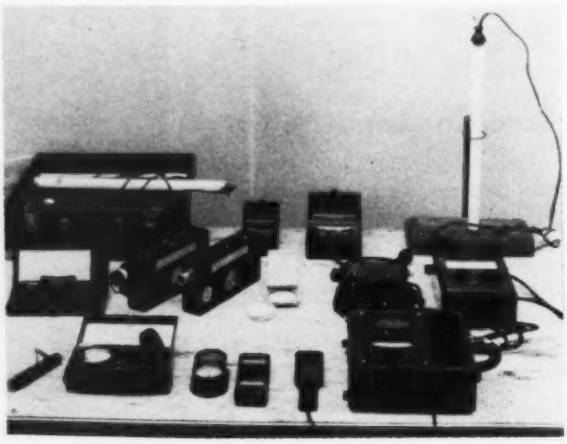
Company	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	Totals
Voltmeter	X	X	X		X	X	X	X	X	X	X	X		X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	29
Wattmeter	X	X			X	X	X	X	X	X	X	X		X		X	X			X			X	X		X	X	X	X	X	X	X	X	24
Foot-Candle Meter	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	32
Visibility Meter	X		X			X			X			X								X	X					X		X	X	X	X			12
Brightness Meter	X	X	X		X	X		X				X					X	X	X	X				X	X	X		X	X	X	X		X	19
Height Meter	X		X		X	X	X		X	X		X		X			X	X		X	X			X				X	X	X	X			18

hensive by 3, less than that by 4, still less by 5, not much by 6, and hardly any by 7. In terms of the number (31) of replies included, the proportions from comprehensive down to hardly any reporting are 23%, 16%, 16%, 13%, 10%, 23%. This apparent lack of adequate reporting among so many of the utilities represented in the replies may be taken as an indication of laxness, but not too much so, because of the differences in size, service area, and departmental organization earlier mentioned.

Instruments Used in Field

A lighting man can be recognized by the foot-candle meter he carries. This holds for 32 of the survey replies but not for the other one of the 33. Next in popularity is the voltmeter which is used in lighting sales by 29 of the replying utilities. The wattmeter is next with 24 mentions. The brightness meter is used by 19, an instrument for measuring height by 18, and the visibility meter by 12. The use of instruments reported in all survey replies is detailed in Table VIII.

Apparently there remains room for improvement in the practices of utility lighting engineers in respect to the quality of illumination they prescribe. This seems a logical conclusion from the fact that 32 utilities use foot-candle meters as against 19 using brightness and 12 using visibility meters. More utilities seem to be selling quantity rather than quality of light.



Wide variety of meters is desirable in lighting sales work

Selling the Relighting Market

Jewelry Store

Both punch lighting and good general lighting without glare are provided in this jewelry store in Irwin, Pa. Cases are lighted with rows of fluorescent lamps installed in the cases. Overhead, continuous rows of 3-tube, 40-w fluorescents with louvers designed for 45 deg shielding to reduce brightness direct traffic to the rear of the store. This is supplemented by 16 200-w mirrored glass reflectors situated to eliminate glare from the cases. Overall illumination is 30 ft-c.

Walter McElravy
West Penn Power Co

Used Car Lot

To display used cars and trucks without expense of overhead floodlighting, reflector type lamps were used under the canopy built to shield vehicles from the elements in this Carlsbad, N. M. lot. It results in an even distribution of light for the comfort of nighttime customers.

Warren Dayton
Southwestern Public Service Co

Jewelry Store

To keep within wiring limitations of a building in which a Philadelphia jewelry store is located, 14 48-in. 4-lamp shielded commercial fluorescent lighting fixtures and 18 singles and one triple 150-w torpedo type incandescent downlights were installed. Under the downlights at counter height intensity is 100 ft-c and at the luggage and flatware counter, 50 ft-c.

George T. Anderson
Philadelphia Electric Co

Table IX.—Kits and Equipment for Lighting Demonstrations

Company	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	Totals
Light Control	X	X	X		X	X	X	X	X		X	X		X				X	X	X	X							X	X	X				18
Black Light	X	X	X		X	X	X	X	X			X			X			X	X	X	X	X		X	X		X	X	X	X				21
Mercury Arc Floodlighting	X						X	X	X					X						X								X						7
Mercury Lamps	X				X		X	X	X					X				X		X		X			X			X						11
Performance of Circuit Breakers and Fuses	X				X		X		X			X							X	X				X	X	X		X						11
Light Transmission Factors	X	X	X		X	X	X	X	X					X				X	X	X	X						X	X	X	X				17
Fluorescent Starter Testing	X					X	X		X								X	X		X		X		X	X		X	X	X					13
Fluorescent Lamp Colors	X	X	X	X	X	X	X	X	X	X	X			X	X			X	X	X	X			X	X		X	X	X	X	X		X	25
Fluorescent Lamp Operation	X	X			X	X	X	X	X									X	X	X	X	X						X	X					14
Fluorescent Lamp Components	X	X			X		X	X	X	X								X	X	X	X	X						X						13
Incandescent Lamp Components	X	X					X	X	X									X	X	X	X							X						10
Incandescent Lamp Reflectors	X	X					X	X	X			X		X			X	X	X	X	X							X		X				14
Contrast Boxes	X		X				X		X					X						X				X	X		X	X		X	X		X	13
Photo-Electric Tubes	X	X			X	X	X		X			X								X				X				X	X					11
Protective Devices	X						X					X								X								X						5
Light Polarization Window Lighting Frame Assembly	X																X			X								X				X	4 1
Displays of Promotion Pieces	X	X	X		X	X	X	X	X	X	X	X	X		X				X	X	X		X	X		X	X	X	X		X		X	24
Motion Pictures	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	31
Strip Films	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	31
Colored Slides of Installations	X	X	X		X	X	X		X	X	X	X	X	X	X			X	X	X	X	X		X	X		X	X	X	X	X		X	27

Promotional and informative literature available to sales allies is displayed at meetings

Facilities for Lighting Demonstrations

For demonstrating the "facts of light" at meetings of sales allies and others, only two of the 33 replies list kits and equipment as comprehensive as is used by the benchmark utility. They are from Kansas City Power & Light and Duquesne Light. At the other extreme are 4 utilities with no demonstration facilities at all. These 4 together have 74,835 industrial and commercial customers in their potential lighting market.

Kits for demonstration of fluorescent lamp colors are used by most of the replying utilities, 26 (79%) of them.

Table X. Layouts and Specifications

Company	1	2	3	4
While working on lighting, field men look for other possibilities of added load.	X	X	X	
Listed fixtures and equipment are tested and evaluated in company laboratory	X			
For specifying, engineers have lists of fixtures and equipment giving makers, trade names, local representatives and distributors	X	X	X	
Schedules of fixtures and other equipment specify makers and catalog numbers or equivalents	X	X	X	X
When supplied, wiring specifications include schedules for feeders and panel boards — Panel Boards	X			
When supplied, wiring specifications include schedules for feeders and panel boards — Feeders	X			
Layouts include schedules for fixtures	X	X		
Complete electrical specifications are furnished to architects for jobs too small to interest a professional engineer	X	X		
Blueprint layouts made for larger jobs, but too small to interest a professional engineer	X	X	X	X
Field men make verbal and pencil sketch recommendations for smaller jobs	X	X	X	X

Lighting engineer submits layout and specifications to prospect and explains features of design

Next in popularity, 21 or 64%, is demonstration of black light, because of its spectacular quality. Then follow in descending order, light control, light transmission factors, contrast boxes, and the others as shown in the column totals of Table IX.

For use particularly at meetings of electrical contractors, architects, and others interested in lighting promotion, 30 of the replying utilities use motion pictures and strip films, 26 use colored slides of local installations, and 24 use displays of technical and promotional literature available to sales allies. (Table IX)

Layouts and Specifications

The replies show only two exceptions to the practice of making verbal and pencil-sketch recommendations by field men for smaller relighting jobs. One of them is from the utility, earlier mentioned, whose commercial manager is looking for a couple of lighting engineers. The other is from Connecticut Light & Power. Responses from this company on other points in this subject of layouts and specifications are so complete however that one must conclude that the smaller jobs get the full blue print treat-

	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	Totals
x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		30
							x																x						3
x	x	x	x			x	x				x			x	x	x	x	x	x	x	x	x	x	x		x	x	x	23
x	x	x		x	x		x				x		x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	25
x			x			x	x		x		x		x	x				x			x		x				x		13
x		x	x			x	x		x		x	x	x	x				x			x	x	x				x		16
x	x		x	x		x	x		x		x	x	x	x	x	x		x	x		x		x		x		x		21
x			x	x		x	x		x		x	x	x	x		x		x	x		x		x		x		x		19
x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	32
x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	31

Selling the Relighting Market

Jewelry Store

Quiet elegance is embodied in the lighting of this jewelry store. Soft general illumination is diffused from four-lamp fluorescent fixtures with dropped glass lenses. To build up attraction value of display cases, internal light sources are installed. As a final touch, fire and sparkle are added to the fine diamond and watch merchandise by 150-w PAR-38 incandescent lamps mounted in gimbals over the display cases.

Alex R. Morrison
Dayton Power and Light Co

Women's Wear Shop

Clever lighting makes an old ceiling look new in this women's wear shop. Black painted ceiling and 40-w fluorescents suspended from 30-in hangers give impression that fixtures float in black sky. Although 47 ft-c is average intensity, perimeter clothing display is stepped up to 65 ft- by 40-w deluxe warm white cove lights.

Irvin E. Elkins
Southwestern Gas and Electric Co.

Used Car Lot

Chrome work sparkles under wide splash installation in this used car lot. Open 1500-w floods at street edge cover 140-ft front with 75 to 100 ft-c level. Rear row of cars receives 40 ft-c with added punch supplied by polished reflector inserts in the upper luminaires on poles.

R. N. Gowing
Worecester County Electric Co

Today's Sales Job

Fur Shop

Illusion of great height is created in this exclusive fur shop in Wilkes Barre, Pa., by the black ceiling from which are suspended, 10 ft above the floor, runs of 8-ft, 2-lamp slimline fixtures arranged in a herringbone pattern, giving an appearance of greater width to the store. General illumination is 35 ft-c. Fitting mirrors are lighted with canopy units containing R-40 floodlights mounted above the level of the fluorescent runs. On the display case are 110 ft-c from R-40 spotlights on 6-ft centers. Concealed behind the volute on each side of the display platform are 96-in., T-8 deluxe cool white lamps. Draperies in the rear are lighted from the cornice with T-8, 30-w deluxe warm white lamps, staggered to prevent breaks in the light line.

E. F. Rimmer
Pennsylvania Power & Light Co

Distributor's Showroom

Since a new dropped ceiling was necessary in a distributor's showroom in Baltimore, a louvered ceiling was chosen to provide a high but glareless 70-ft-c level of illumination. Ceiling was constructed with louver cells 1 ft sq and 6 in. deep, behind which were mounted continuous rows of single lamp reflector, slimline strips, 18 in. above louvers on 2-ft centers.

E. R. White
Consolidated Gas Electric Light & Power Co

Table XI—Advertising Lighting

Company	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	Total
EEI Mailing Pieces.....	X	X	X			X	X	X		X	X	X		X	X	X		X	X	X	X			X	X	X		X			X	X	X	23
Promotional Publication	X		X	X				X	X			X									X	X					X	X						10
Lighting as a service in institutional advertising	X				X		X	X	X		X			X	X			X		X	X				X		X	X	X					15
Newspaper ads featuring local installations	X				X		X	X													X				X			X						7

ment in exactly the same manner as do the larger ones.

With the exception again of the utility that has no lighting men, every reply says that blue print layouts are made for the larger installations. But when it comes to furnishing complete electrical specifications to architects, the exceptions are more numerous. Table X shows 19 of the 33 utilities doing this work.

Layouts and specifications include schedules for fixtures according to 21 replies (64%), for feeders according to 16 (49%), and for panel boards according to 13 (40%). Specification of fixtures and other equipment by makes and catalog numbers or equivalents is noted by 25 of the replies, 76%. In 23 (70%) of the replies, it is stated that lighting men have comprehensive lists of lighting and associated equipment so that trade names, makers, local representatives and distributors can readily be found.

As for testing and evaluating fixtures and other equipment before recommending them to customers, only two utilities line up with Georgia Power on this point. One of these, Blackstone Valley Gas & Electric, has such tests made in the laboratory of Brown University. In one reply it is remarked that while no laboratory testing is done, sample installations are made in company properties. Another comments that company testing is not necessary because of the work in this line by the Electrical Testing Laboratories and by manufacturers. This would seem to be the general feeling. "Bird dogging," looking for other possibilities of added load, while working on lighting jobs is reported in 30 (90%) of the replies.

Reddy's Roundup of Electrifying Facts!
PLENTY OF ICE CUBES
1¢ worth of electricity will keep an average-size refrigerator cold for 10 hours.
The Cost of Living is UP.
The Price of Electricity is DOWN!
Since 1932 the cost of living in Georgia has more than doubled. But the average price per kilowatt hour of Georgia Power's residential electric service is less than half what it was 20 years ago.
MORE LIGHT on the job!
Planned light for industry means greater production, fewer accidents, improved morale. Georgia Power's lighting engineers designed lighting systems for 173 industrial plants in 1952.
Georgia Power

Lighting is included in institutional advertising by some utilities

Advertising Lighting

Of all means for advertising lighting, the "Planned Lighting" mailing pieces available from the Edison Electric Institute are the most widely employed. Consistent use of these pieces is reported by 23 (70%) of the replies, as shown in Table XI.

Lighting is occasionally included in institutional advertising in newspapers, according to 15 (45%). Newspaper advertising of commercial and industrial lighting is noted only in 7 (21%) of the replies. Publications devoted to lighting are mailed to commercial and industrial customers by 10 (30%) of the replying utilities. In several of the replies it is noted that these publications are obtained from outside sources and are not utility productions featuring local installations.

("Bright Spots," published by the bench-mark utility, is bi-monthly, 8 pages, 7 x 10 in., picturing and describing only installations in the company area. Lighting engineers note on their job reports whether or not the particular installation will make copy for the publication.)

Although Table XI at the top of this page shows 4 utilities doing no advertising of commercial and industrial lighting as listed in the survey form, it is probably wrong to conclude that they are doing nothing at all in this direction.

There are other ways to publicize modern lighting and it must be assumed that they are used to some extent by the 4 utilities whose columns are blank in the tabulated data.

Selling the Relighting Market

Bank Office

Uneven lighting ranging from 15 to 100 ft-c at accounting machines was converted to a constant 65 ft-c level by installation of 9 8-ft 2-lamp and 7 4-ft 2 lamp fluorescent fixtures at a bank accounting office in Lowell, Mass. This, combined with installation of a sound absorbing ceiling, cut down on absenteeism caused by excessive fatigue.

James W. Armour, Jr
Lowell Electric Light Corp

Department Store

Making available maximum space for handling of goods. That's what was done in a department store overcrowded with merchandise by installation of a luminous ceiling, consisting of a plastic louver 9 ft 9 in. above the floor. By placing single lamp channels 30 in. on center, 27 in. above the louver, and painting the plenum white, 72 ft-c was delivered at counter height. Load increased from 18 to 50 kw.

William Harrison
Philadelphia Electric Co

Women's Shop

A diamond arrangement of fixtures was designed to fit in with a saw-tooth arrangement of counters at a women's apparel shop in Oceanside, Calif. The fluorescent units are 2-lamp 8 ft louver-shielded fixtures, with matching "eyeball" spots to connect fixtures. Average lighting intensity is 55 ft-c.

David F. Curtis
San Diego Gas & Electric Co

Selling the Relighting Market

Hardware Store

Higher intensity general lighting makes darker merchandise stand out in this hardware store. To add extra sparkle to the china and crystal displays, incandescent is mixed with bare 20-w fluorescents in the canopies over the island shelves. At night, suspended bullet fixtures make a show window of the store.

Warren Dayton
Southwestern Public Service Co

Shoe Store

Easy viewing of the shoes at floor level made the cash register ring at this store. Fitting areas were bathed with 70 ft-c intensities from recessed 8-ft T-12 fluorescents while spill light from PAR-38 floods and spots added reds for color rendition. The gimbaled incandescents highlighted displays.

Henry W. Chapman
Malden Electric Co

Clothing Store

Pleasant atmosphere for shopping is produced by 60 ft-c level from 96-in slimline fluorescent and 150-w PAR 38 floods. More attractive clothing displays are achieved by use of accent units in the fluorescent lines. These use 200-w filament lamps to assure proper appraisal of materials.

E. A. Hanson
California-Pacific Utilities Co

Today's Sales Job

Drug Store

Display window effect of this drug store is created by 60 ft-c foundation of shielded fluorescents. As customers enter, ceiling spots accommodate eyes, highlight "specials." Valance lighting perks up merchandise on wall shelves and silhouettes the signs.

C. J. Bunce
Bureau of Home Appliance of San Diego

Hotel Cafeteria

So much more inviting was the food under de luxe cool fluorescents that cafeteria patronage sharply increased. Illumination of 30 ft-c comes from ganged two-light 40-w recessed louvered troffers. Tasty food selection is enhanced by 150-w PAR-38 spots recessed over serving counter.

H. M. White
Consolidated Gas Electric Light & Power Co

Small Machine Shop

First time operations in this machine shop are more accurate with 90-w T-17 fluorescent providing 70 ft-c on the working plane. Conduit supporting fixtures conveniently carries 110-v distribution for small equipment. Auxiliary lighting on each machine steps up illumination.

James F. Williams
Dayton Power & Light Co

Table XII—Summation of Lighting Promotion Activities

Company	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	Totals
Education of consumers—professional, educational, trade, service and social groups	X	X			X	X	X	X	X		X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	28
Education of personnel of other branches of the electrical industry by training courses, meetings, etc.	X	X	X		X	X	X	X	X	X	X	X			X	X		X	X	X	X		X			X		X	X	X	X		X	24
Education of utility personnel in training courses and meetings	X	X			X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			X		X	X	X	X	X	X	X	X	26
All types of sales promotion—direct mail, newspaper advertising, publications, etc.	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X		X	X	X	X	X		X		X	28
Cooperation with local interests in sales training	X	X			X	X	X	X	X		X	X			X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	26
Sales helps to contractors, dealers and distributors	X	X	X	X	X	X	X	X	X	X	X	X			X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	29
Special activities—expositions, exhibits, demonstrations and campaigns	X	X	X	X	X	X	X	X	X		X	X		X		X		X	X	X	X		X	X		X	X	X	X	X	X	X	X	28
Continuous effort to improve cooperation with architects	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	31
Also with professional engineers	X	X	X		X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	29
Also with contractors	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	31
Also with distributors	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	31

Summing It All Up

The comparatively few blank spaces in Table XII are the basis of the conclusion stated in the first sentence of this report, that most of the replying utilities think they are doing a good job in commercial and industrial lighting promotion. Only one, once again the utility that is looking for a couple of lighting men, admits nothing at all is being done. Over half, 17 of the 33 replies, give themselves a perfect score on the points covered in this final section of the check list.

In 31 (94%) of the replies it is stated that continuous effort is made to improve cooperation with architects, contractors, and distributors, and 29 utilities, 88%, are working as hard on professional engineers. Education of customers—professional, educational, trade, service, and social groups—is reported by 28 replies, 85%, and the same number report special activities such as expositions, exhibits, demonstrations, and campaigns. Also 28 replies check "yes" on the point of all types of sales promotion—direct mail, newspaper advertising, publications, demonstrations, etc.—but several of them make certain exceptions.

As stated earlier in this report, the purpose of this survey was to bring together for the information of those interested the ways and means by which electric utilities are promoting and selling commercial and industrial lighting. The results here reported indicate how widely these ways and means are employed, and that is all that can be taken from them in the way of definite conclusion.

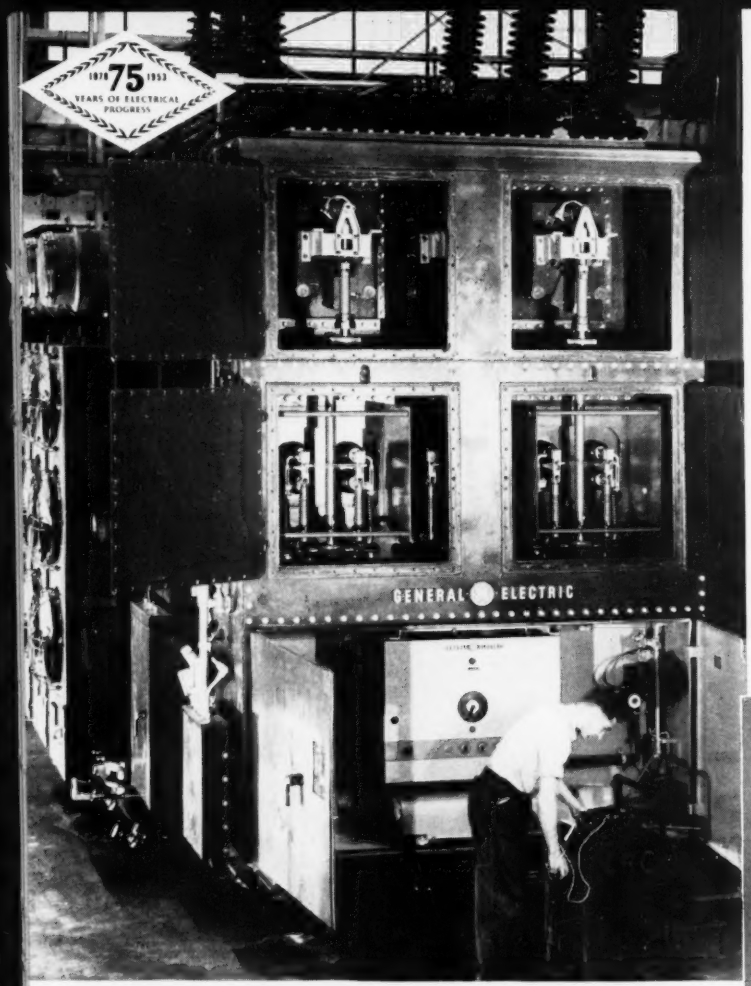
But unless he is totally ignorant of the matter covered and thus can be wholly objective, the compiler of survey replies inevitably receives an over-all impression for which he may not be able to find any specific evidential support in the material with which he is working. This is the case in respect to this survey. The impression is that while some utilities are really working in promotion and sale of commercial and industrial lighting, commercial particularly, others are merely making motions, and still others are actually neglecting an important source of revenue.

It is to be expected, when NEMA's National Lighting Bureau is organized and gets into full operation, that utility activity along this line will increase. Perhaps Electrical World should plan to repeat this survey in a couple of years, at which time the compiler of survey replies should receive a different impression as he plows through them.

Acknowledgment

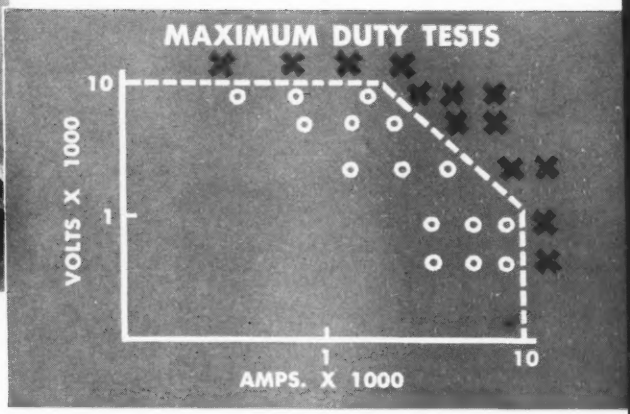
Electrical World thanks the following utilities for their cooperation in this survey of lighting sales organizations and operations:

Appalachian Electric Power Co.
Black Hills Power & Light Co
Blackstone Valley Gas & Electric Co
British Columbia Electric Railway Co Ltd
Central Hudson Gas & Electric Corp
Cincinnati Gas & Electric Co
Commonwealth Edison Co
Connecticut Power & Light Co
Consumers Power Co
Dayton Power & Light Co
Detroit Edison Co
Duquesne Light Co
Electric Power Board of Chattanooga
Florida Power Corp
Georgia Power Co
Gulf States Utilities Co
Idaho Power Co
Interstate Power Co
Iowa Public Service Co
Kansas City Power & Light Co
Kansas Power & Light Co
Long Island Lighting Co
Metropolitan Edison Co
Mississippi Power & Light Co
Missouri Power & Light Co
New Orleans Public Service Inc
Niagara Mohawk Power Corp
Ohio Edison Co
Oklahoma Gas & Electric Co
Pennsylvania Power & Light Co
Public Service Electric & Gas Co
Rochester Gas & Electric Corp
St. Joseph Light & Power Co
Shawinigan Water & Power Co
Southern California Edison Co
Washington Water Power Co
Wisconsin Public Service Corp



FINAL TESTS on control wiring are made prior to shipment. Large, hinged doors, re-usable Nitrile rubber gaskets, and roomy compartments simplify field inspection and maintenance.

No need to worry if a short circuit occurs during a tap change



G-E Load-Ratio-Control operates successfully even under maximum short-circuit duty

If a system short circuit occurs while a tap change is under way, General Electric Load-Ratio-Control is designed to complete the operation successfully . . . *even under the maximum short-circuit duty to which the transformer may be subjected.*

Contactor interrupting tests, made during the design of each standard LRC mechanism, assure you of dependable operation. Oscillograms of each test shot record the current and voltage values and the arcing time. These points are plotted on a logarithmic chart like that shown above. Points showing excessive arcing time are recorded as crosses. Satisfactory tests are recorded as circles. A line enclosing area of satisfactory performance under short circuit defines the range of normal application of contactor.

From such test data, G-E transformer designers are furnished an application chart for each standard equipment that shows the range of transformer ratings to which the equipment can be applied.

Remember too, that in G-E load-ratio-control, the four design factors: insulation life, arcing-tip life, mechanical life and short-circuit duty are all *co-ordinated* to give you good service, longer periods between inspection and less maintenance.

For full information on G-E Load-Ratio-Control, contact your nearest G-E Apparatus Sales Office, or write General Electric Company, Section 421-7, Schenectady 5, New York.

You can put your confidence in—

GENERAL ELECTRIC

DISTRIBUTION TRANSFORMERS

different from others because....

.....Strenicor pressure terminal clamps.....

minimize breakage due to stress-corrosion

Months or even years after installation, the strain imposed by tight connections may cause breakage of secondary terminals due to stress-corrosion (season cracking). This causes outages, service calls and customer inconvenience.

METALLURGICAL STUDIES of the causes of stress-corrosion led to the development of Strenicor—a new copper-nickel-silicon alloy. After successive solution and aging heat treatments, this alloy provides a high tensile strength of 107,000 psi—a yield strength of 83,000 psi. Thus General Electric Spirakore* transformers with Strenicor secondary terminals are practically immune to failure by stress-corrosion.

*Registered Trade-mark of General Electric Co.

REMEMBER . . . all transformers are not alike . . . compare the General Electric plus features in the chart below and see for yourself.

For more information on distribution transformers, either unit-type or conventional, contact your nearest G-E sales office, agent or distributor, or write to General Electric Company, Section 431-7, Schenectady 5, New York.

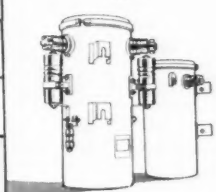
You can put your confidence in—

GENERAL ELECTRIC

ALL TRANSFORMERS ARE NOT ALIKE
(make this simple comparison and see)

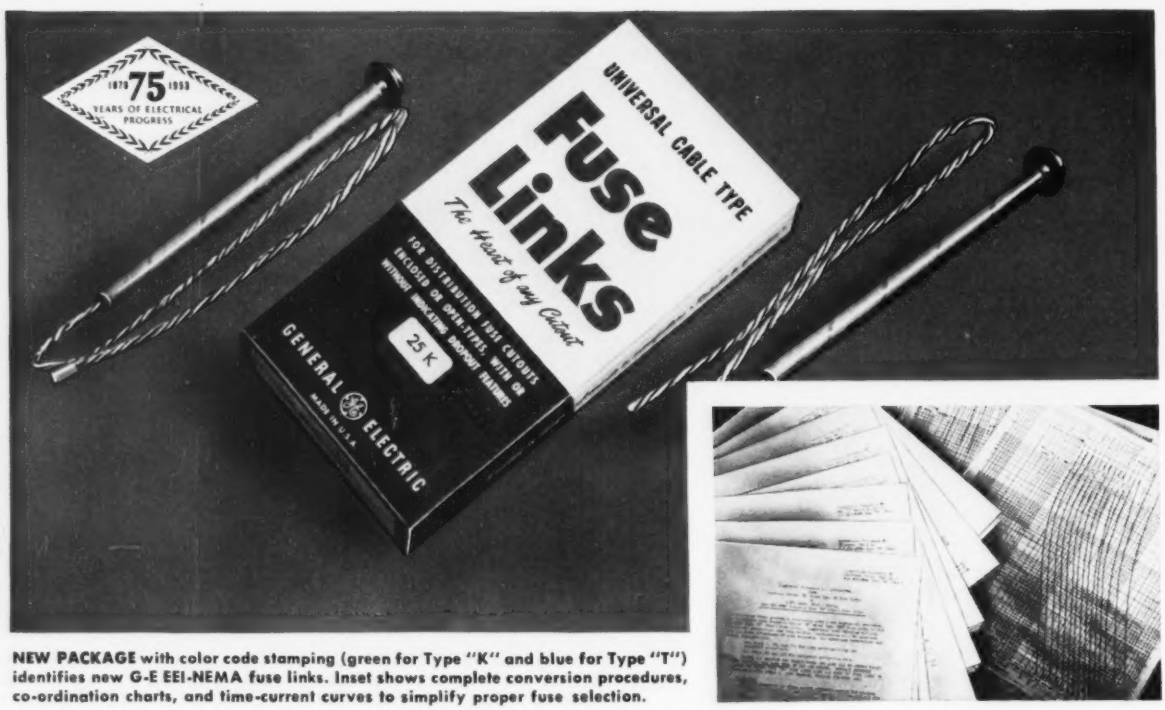
FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	YES	NO	NO	NO	NO	NO
Nitrile rubber gaskets at all tank openings	YES	NO	NO	NO	NO	NO
Strenicor pressure terminal clamps	YES	NO	NO	NO	NO	NO
Insulated clamp-type connectors on tank wall hv bushings	YES	YES	YES	NO	YES	YES
One-piece cover band	YES	NO	NO	NO	NO	YES
Gapped valve-type arresters	YES	NO	NO	NO	NO	NO
Nationwide company-operated service facilities	YES	YES	NO	NO	NO	YES

1876 75 1951 YEARS OF ELECTRICAL PROGRESS



UNIT-TYPE CONVENTIONAL

"Take your choice G. E. makes both"



NEW PACKAGE with color code stamping (green for Type "K" and blue for Type "T") identifies new G-E EEI-NEMA fuse links. Inset shows complete conversion procedures, co-ordination charts, and time-current curves to simplify proper fuse selection.

G-E's new EEI-NEMA universal cable-type fuse links provide extra benefits from fuse link standardization

And it's Easy and Economical to Convert to G-E Standard Links

GENERAL ELECTRIC'S new EEI-NEMA standard fuse links not only meet all of the utility-sponsored EEI-NEMA requirements, but also offer many additional operating benefits. They provide both electrical and mechanical interchangeability . . . long desired by users . . . and there's a Type "K" (fast) and a Type "T" (slow) G-E standard link in both preferred and non-preferred ratings, for replacing practically any nonstandard links now in use.

G-E's standard links give EXTRA benefits. Low melting temperatures prevent drying, embrittling, or burning of auxiliary tubes or fuseholder tubes . . . thereby maintaining the full interrupting capabilities of the cutout.

Extra-long auxiliary tube gives greater dependability for low fault currents, and better full-range operation of any cutout.

High continuous-current-carrying capabilities enable continuous over-current rating in excess of standard ratings, and simplifies replacement of N-rated links with practically no change in equipment protection.

Higher accuracy of electrical characteristics gives you greater assurance of attaining planned protection and co-ordination, with more dependable isolation of faults and minimizing of system outages.

Mechanical construction combines liberal strength of fusible element and strain wire with extremely flexible cable that permits free indicating and dropout action of cutouts.

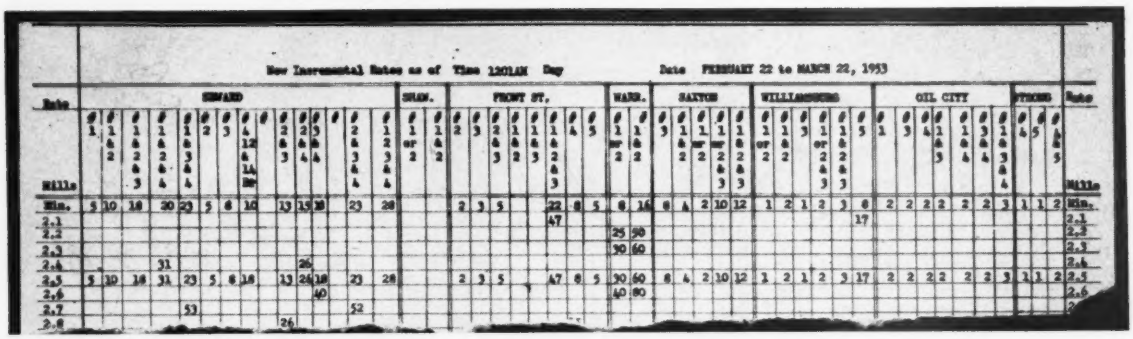
It's easy and economical to convert to G-E standard links—there's no need for a new co-ordination study—in general, you simply replace section and branch fuse links with the proper G-E Standard fuse links; thereafter you replace equipment fuses with G-E Standard fuse links at the most opportune time—when equipment fuses blow or as equipment is serviced. You won't have to throw away your present equipment fuse links.

There's a G-E Standard fuse link to give practically the same equipment protection as any "N" rated fuse link you are now using.

For information, get in touch with your nearest G-E representative, or write to General Electric Co., Section 433-1, Schenectady 5, New York.

You can put your confidence in—

GENERAL ELECTRIC



DATA SHEET incorporates information on generating costs of individual units, combinations for each station, and megawatts

Calculator Replaces Daily Load Schedule

C. H. CONRAD, System Operator, Pennsylvania Electric Co, Johnstown, Pa.

An incremental loading calculator devised by load supervisors of Pennsylvania Electric Co has eliminated the need for a daily load schedule. It provides a simple and flexible means of arranging sufficient data for proper loading of generator stations and generator unit combinations to meet almost all system loads.

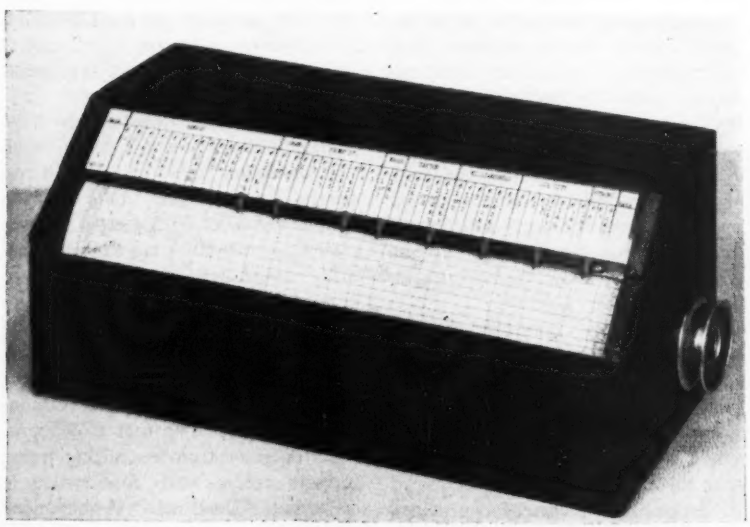
A special form was prepared that lists incremental block loading in megawatts for all generator units and combinations at each station in vertical columns. Numbers heading the columns represent unit combinations. Figures in first and last columns represent incremental costs in mills per kw for all blocks of load on the same horizontal line. Vertical and horizontal lines have been made to conform with standard 12-pitch typewriter spacing, six lines to the in. for convenience in preparing new sheets.

The sheet is mounted on a wooden drum, which is made to rotate in a box having five sides. One side is of glass through which a segment of the drum is visible. A hairline runs horizontally through the glass. As the drum is rotated, the proper load assignment of any generator or combination for any system load or cost level can be read under the hairline.

To indicate the generator or combination operating at a station, a metal strip containing sliding beads, similar to that used for indicating decimals on calculating machines, is mounted on the box. When putting in or taking out of service a generator it is only necessary to move the bead to the correct column, rotate the drum and read the proper distribution of generation for all stations.

The drum has a diam of five in. and is 14 in. long. Its box is 5¾ in. wide, 6¼ in. high and 15 in. long. These dimensions can be made to meet the requirements of any number of stations and unit combinations. The sheet is secured to the drum by wedging both top and bottom edges in a crevice running lengthwise across the drum.

Calculator replaces the daily load schedule, which was compiled from station and units costs of generator and boiler starting, no-load spinning, boiler banking and incremental loading. Such a schedule is based on load forecast and available equipment. A forced outage or forecast error can upset the load schedule, thus requiring the making of a new one rapidly. An incremental loading calculator overcomes this inconvenience.



LOADING CALCULATOR has sufficient data listed in tabular form so that load dispatchers can dispense with a daily load schedule. This instrument is simple and fast to operate

Strain History Affects Copper Characteristics

Prior strain history has a marked affect on room-temperature properties and microstructure of high-purity copper. Tensile tests were conducted by the National Bureau of Standards on oxygen-free high-conductivity copper initially as annealed, as cold drawn different amounts, and as prestrained in creep.

Copper bars, 99.99% pure, were processed from the same lot, but each

had been subjected to different conditions of annealing or cold drawing. Specimens taken from the various bars were subjected to different amounts of prestraining in creep, under tension, at 110, 250, or 300 F. They were then tested in tension at room temperature at the same extension rate, 1% per min.

Cold-drawing copper at a relatively fast strain rate generally resulted in increased strength and hardness, but in decreased ductility (as measured by the extension and reduction of area at fracture). Prestraining at a high temperature or a low strain rate, on the other hand, generally resulted in reduced strength and hardness as well as reduced ductility.

Specimens with the larger grain sizes showed lower yield strengths and hardness values. But grain size had very little effect on tensile strength, fracture strength, and ductility. Hardness values of fractured specimens, obtained at room temperature, confirmed results of tensile tests.

Microstructures of specimens were, in general, consistent with assumptions that cracks of a transcrystalline nature, and substructures, are nucleated during the second stage of creep. These phenomena are associated with prestraining at low temperatures and fast strain tests.

Prestraining at elevated temperatures and slow strain rates tended to result in less ductile fractures and in intercrystalline cracks.

Eliminating Duplicate Sheets Saves Money

Worth-while savings can be made by eliminating duplicate sheets and printing single copies of test records. This was the result of cost studies, by Hartford Electric Light Co, on testing of 25-amp and less, single-phase, residential watthour meters. Tests on each meter are conducted every 8 years.

Formerly, it was necessary to count original records daily before filing them with consumers' cards. Duplicates were counted monthly for tabulation of commission data and stored in a vault. Elimination of duplicates resulted in the following yearly savings:

$32—test sheets, $15—carbon paper, $96—printing, and $48—handling. Vault costs are also saved but have not been calculated.

PORTABLE TEST BENCH for checking potential transformers effects great savings by almost eliminating set-up time. Transformers with ratios up to 600 to 1 can be tested

Portable Bench Cuts Test Set-Up Time

W. A. ERSKINE, Laboratory Supervisor, Shop and Test Division, Southern California Edison Co, Alhambra, Calif.

Portable test bench, designed and built by Southern California Edison Co, permits testing of potential transformers having maximum ratios of 600 to 1 and 500-va rating in various locations on test floor with ease and efficiency. With a set of portable instruments semi-permanently connected, bench has reduced set-up and "striking" time to nearly zero, thus reducing overall testing time.

Components built into bench include 20-amp circuit breaker, magnetic contactor, adjustable autotransformer rated 14 amp and 0-270 v, low-range current transformer, and switches. Current transformer with 0.5/1.0/2.5/5-5-amp rating and associated range selector switch permit use of standard 5-amp instruments during core-loss tests. Large red and green lights on bench top visually indicate contactor position.

All operating controls are on sloping panel within easy reach of operator. Portable instruments for measuring ratio, phase angle, exciting current, and core-loss are on bench top. They are connected to bench circuits through retractible leads.

Three-phase power is obtained through four-wire cable that plugs into side of bench. One conductor is ground connection for bench frame. Three pairs of leads for connecting to standards, test, and energizing transformers are brought out at back of bench. They are coiled and hung by straps when not in use.

Bench consists of welded angle-aluminum frame covered with ⅛-in. sheet aluminum. It rests on four 5-in. swivel casters. Top surface is Formica bonded to plywood. Space in center of bench is available as writing area.

Access door at front of unit opens to floor forming a convenient platform for operator. In open position, door relieves load on front casters and serves to anchor bench in position while in use.

After potential transformers have been connected to test leads, each test condition may be selected on control panel. The only wiring change required during tests is completion of potential transformer primary connections when going from core-loss to "Silsbee" tests.

For safety of operating personnel, a two-pole Cannon plug and receptable in the input circuit to adjustable autotransformer serves as visual disconnecting device. Also foot switch prevents operator from energizing transformers except when foot switch is depressed. "Dead man" switch under rubber mat on operator's platform is an additional safety feature.

MAIN STREET OF OAKWOOD, OHIO. LIGHTED WITH G-E FORM 206 FLUORESCENT LUMINAIRES, SETS PACE FOR WHITEWAYS OF THE FUTURE

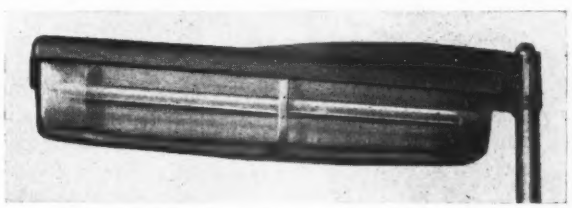
New General Electric Fluorescent Luminaire Introduces a Brighter, Broader Light Pattern

An entirely new standard of modern street lighting has been established by the new Form 206 fluorescent luminaire. Its broad, bright light pattern can make your city's busy streets the finest whiteways in the world. Its high light output is held constant throughout a broad range of temperature. This means you'll get effective lighting in any weather and during all hours of darkness. The new six-foot "Rapid Start" G-E fluorescent lamps are designed specifically for outdoor operation. They require no starters, have no starting flicker, and light within a second after being turned on.

NEW EASY INSTALLATION. Designed for speed, simplicity, and economy of installation, the Form 206's bracket is an integral part of the fixture. It requires no guys, trusses, or supports. The entire unit, including bracket, weighs about 100 pounds, and is less than seven feet long.

NEW ECONOMICAL MAINTENANCE is assured with lamps rated 7500 hours. The completely enclosing plastic globe, hinged at one end, swings down and remains in position for fast, easy, servicing.

FOR MORE INFORMATION contact your nearest General Electric Sales Office or write for Bulletin GEC-963, Section 452-133C, General Electric Co., Schenectady 5, New York.



MODERN APPEARANCE of aluminum housing and clear plastic globe adds beauty to your city's streets. Clean appearance is made possible by internal wiring and internal ballast mounting.

You can put your confidence in—

GENERAL ELECTRIC

TRANSVERSE PLATFORM that moves 5 ft out over parked cars permits unimpeded work even on Main Street where parking is permitted

ELEVATOR, attached to hydraulic lift, provides access to top of truck body. Collapsible platform railing is in lowered position

Truck Platform Extending Over Cars Speeds Street Light Maintenance

A specially equipped truck, designed and constructed by Niagara Mohawk Power Corp, speeds street light maintenance even when automobiles are parked next to the pole. Transverse motion as well as vertical motion of the working platform solved this problem. Other truck features include an elevator, which eliminates ladder climbing, and complete washing facilities.

To reach over parked cars that impede maintenance work, working platform is designed with a hydraulic-operated transverse motion of 5 ft in the curb-side direction. Vertical platform motion is from a 10-ft height to 30 ft. Minimum height was determined by clearance limitations of viaducts in Buffalo. Maximum elevation is fixed by 25- to 30-ft lamp heights.

Platform raising and lowering speed is variable. But present practice is to control it at 38 sec from lowered position to full height. Platform working space is 48x84 in., which is suitable for cleaning and servicing sodium installations.

A collapsible railing around the platform protects workers. This is raised and lowered by an automotive starting motor, through gear reducers and cam shaft, and is controlled by a foot switch on the truck body catwalk when the platform is in lowered position.

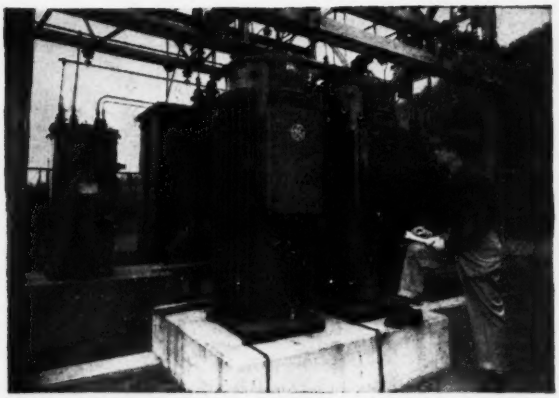
Access to the tower platform is by an elevator attached to the hydraulic lift. In operation, a man enters the elevator from inside the truck body and is raised to the catwalk on top the body, onto which he steps. After the tower is lowered and collapsible railing is raised, worker mounts the platform, which is raised up and out over parked cars.

Storage shelves, water tanks, and a heating unit for maintaining an even, hot temperature for washing and rinsing water are incorporated within the body. Also included is a portable ac generator, used to power a buffer.

Average daily service stops number 70 for incandescent lamp installations and six for sodium lamp installations. This includes complete washing with trisodium solution and rebulbing of all lamps.

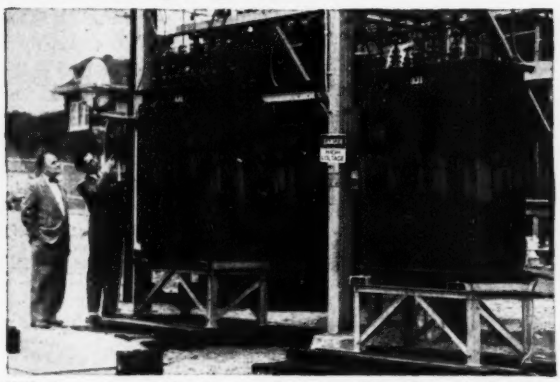
Golf Tee Bulletin Board

BULLETIN BOARD having holes on 1-in. centers with golf tees to attach notices and bulletins, makes neat appearance and eliminates usual untidy condition of board. Remodeled Division Office of Mississippi P & L Co at Jackson now uses this board



IRS single-phase induction regulators supply the finest regulation obtainable for heavily loaded feeders where voltage variations are frequent and immediate response essential. Their sealed tank construction prolongs oil life.

ML32 step regulators provide low-cost dependable regulation on branch and rural circuits in thirty-two 5/8% steps. As with all G-E station-type voltage regulators, controls of the ML32 maintain Class I accuracy.



IRT three-phase induction regulators combine three single-phase IRS regulators in one tank with a single set of controls. They provide high quality stepless regulation for balanced loads. Rugged construction assures long life.

MLT32 three-phase step regulators adjust voltage in thirty-two 5/8% steps. Best suited for lines with balanced loads, they feature rugged simplicity in construction—accessibility and ease of maintenance of switching mechanism.

Solve any feeder voltage problem with one of these G-E regulators

You can get exactly the type of voltage correction you need . . . dependable, low-cost regulation . . . the finest regulation obtainable . . . for circuit capacities from 125 kva at 2.4 kv to 25,000 kva at 69 kv . . . by choosing from General Electric's complete line of voltage regulators.

G-E Induction Regulators, with their prompt response to voltage variations, smooth stepless control, and negligible maintenance, provide the highest quality regulation obtainable. They're available for circuits 15 kv and below, 3000 kva and below . . . single-phase for individual phase control . . . three-phase for balanced loads.

G-E Step Regulators offer economic advantages where you handle large blocks of power at higher voltages, and where you need supplementary regulation on your branch and rural feeders. G.E.'s MLT32 three-phase step regulator is available for all standard voltages up to 69 kv, circuit capacities up to 25,000 kva . . . ML32 single-phase regulators offer ±10% regulation in thirty-two 5/8% steps in ratings 13,800Y/7960 volts and below, for three-phase banks rated approximately 2000 kva and below.

For more information on IRS, IRT, MLT32, ML32 regulators, see your local G-E representative or send for bulletins GEA-2985, GEA-2985C-1, GEC-716, GEA-5752, respectively. General Electric Company, Schenectady 5, New York. 423-2

GENERAL ELECTRIC

Engine-Generators for Emergency Service

Suggestions are listed for response to inquiries on contemplated installations of gasoline-engine-driven generator sets for use during electric-service interruption. This adaptation is from material prepared by Westchester Operations of Consolidated Edison Co of New York Inc

Suggestions for engine-generator purchases and installations have been prepared based on information from manufacturers, installation and maintenance organizations, and electric utility personnel. Inquiries on installations are usually at a peak after ice, sleet and wind storms.

Engine-generator sets to supply a limited amount of service can be purchased at prices from $300 to $900 depending on the capacity of the equipment.

For an average home (6-8 rooms) without electric cooking or water heating, a set would cost approximately $500 to which should be added transportation, installation, fuel storage, wiring, piping, permits, etc.

Installations may be made subject to the utility's approval, regulations and inspection. Also a double-throw switch is to be installed so that only one source of power can be used at one time, either the main supply or the emergency supply from the engine-generator set.

Before purchasing the engine-driven generator set, the following precautions should be observed

1. Do not expect that such emergency equipment will be able to provide as adequate and dependable a supply of power as you have been accustomed to.

2. Be sure that you understand the limitations of such emergency equipment. Do not expect that you can operate all your electrical equipment at one time with a set of limited capacity.

3. Purchase an engine-generator set of adequate capacity to meet your minimum emergency requirements.

4. Insist on an actual demonstration in your own home before purchase to be sure the equipment will actually be able to operate the minimum amount of equipment which you will require during such emergencies.

5. Do not order equipment by mail and expect that it will prove satisfactory. Insist on a survey of your requirements to be sure that the equipment will be of adequate capacity and proper voltage to operate your equipment.

6. Do not expect to get immediate delivery when a storm occurs. Select your equipment when you have plenty of time to consider your requirements and see that it is properly installed.

7. Be sure that the equipment you buy is made by a responsible manufacturer who will stand back of his equipment and supply parts when required.

8. Be sure that the manufacturer has made local arrangements for servicing his equipment.

9. Have the equipment installed by a licensed electrician and insist on a certificate from the Board of Fire Underwriters. See that the installation complies with local regulations.

10. After the equipment has been installed and has been checked by the utility, check the actual operation of the equipment from time to time to be sure that it will be in good operating condition when you require it.

11. Do not store gasoline or oil or a mixture of gasoline and oil in the engine-generator set. It may not be used for years and gasoline and oil left in such equipment becomes gummy in time and will prevent the proper operation of the equipment when you require it. Drain off all gasoline and oil after you have used the equipment.

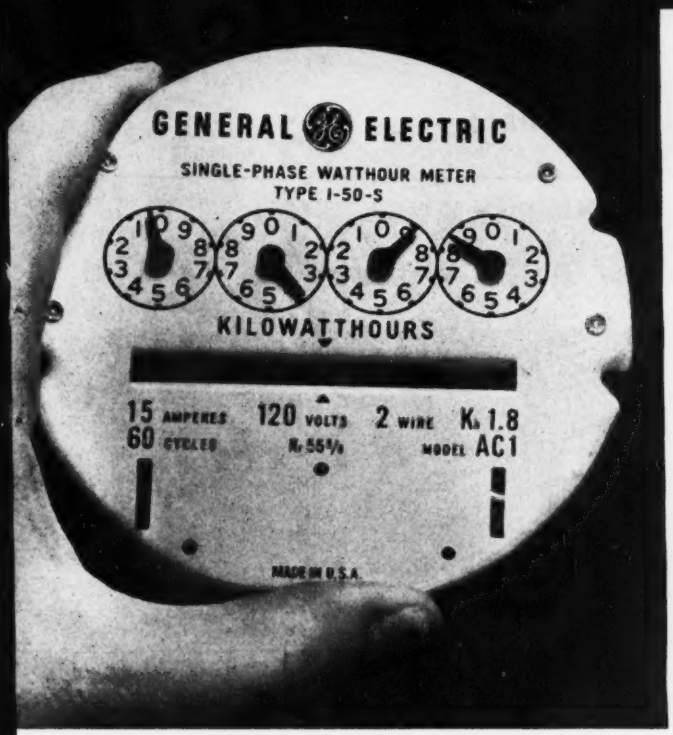
12. Be sure to maintain an adequate supply of fuel on hand at all times for immediate use in an emergency. Such fuel should be stored in a container approved by the Board of Fire Underwriters and checked from time to time to see that it is in good condition.

13. Do not expect that you will be able to get a supply of fuel when an emergency arises. Roads may be blocked by snow or ice or fallen trees. Keep it on hand.

14. Keep equipment in a safe dry location. Unless equipment is properly protected it may not be available for use when you require it.

15. Be sure that you know where you can get service when you need it. Know where you can locate the authorized service agency in your area.

16. Read the instruction book which should accompany such equipment and be guided by the advice of the manufacturer who knows most about his own equipment and who is most interested in insuring you satisfactory service.



With either the pointer register . . .

Or the snap-action cyclometer register . . .

Extra-large Numerals on G-E I-50 Meters Reduce Reading Time, Cut Costly Errors

General Electric certified I-50 watthour meters, with simplified, legible registers, facilitate meter-reading and reduce costly reading errors. With the ease of reading afforded by the cyclometer-register design, new meter readers can be trained quickly and dependably, saving time for meter foremen.

ACCURATE READINGS with the cyclometer register are much easier because the figures are extra-large. And magnetic snap-action trips the cylinders to make sure that no half-numerals are showing. This legibility greatly facilitates self-billing and also helps in eliminating billing errors, customer complaints, and rereading.

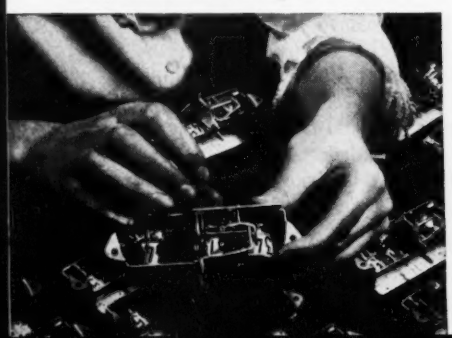
FOR MORE INFORMATION on the G-E certified watthour meter, see the color movie "Accent on Accuracy." Call your nearest G-E representative or write General Electric, Schenectady 5, N. Y. 601-98

You can put your confidence in—

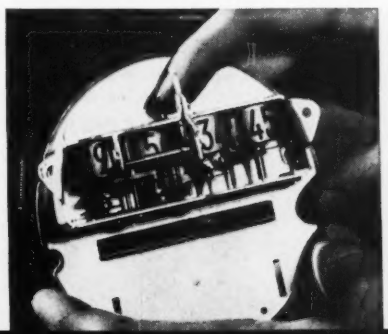
GENERAL ELECTRIC

EASY-TO-READ cyclometer register on I-50 watthour meter has figures four times the conventional size.

REGISTER ACCURACY is assured by frequent factory inspections to give dependable, maintenance-free performance.



FAST RESETTING is easy with plunger to de-mesh gears for first two cylinders. Vertical shafts reduce friction.



SEPARATE REGISTER for installation on present meters makes large-figure legibility available for all meters.

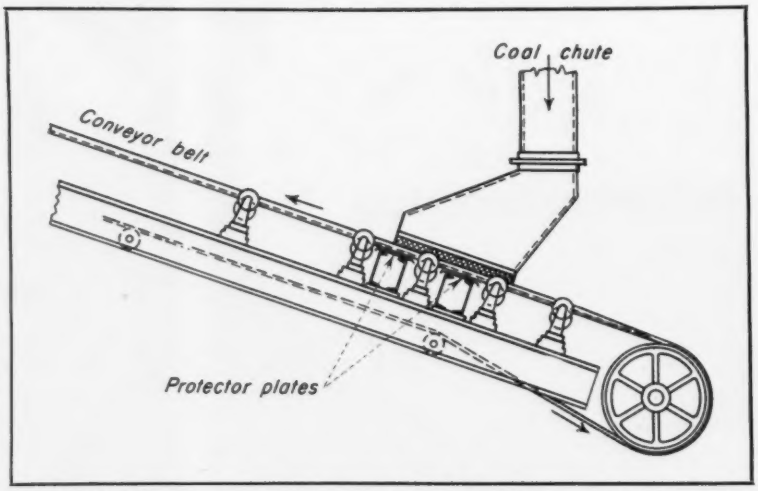
Tramp-Iron Protector Stops Coal Belt Tears

C. B. WATSON, Philo Plant Yard Dept, Ohio Power Co, Philo, Ohio

Installation of two protective plates prevent tramp iron that may come through the coal chute from slitting the coal-conveyor belt. The plates are inexpensive compared with costly belt tears and operational delays necessitated by repairing as much as 50 or 100 ft of slit belt.

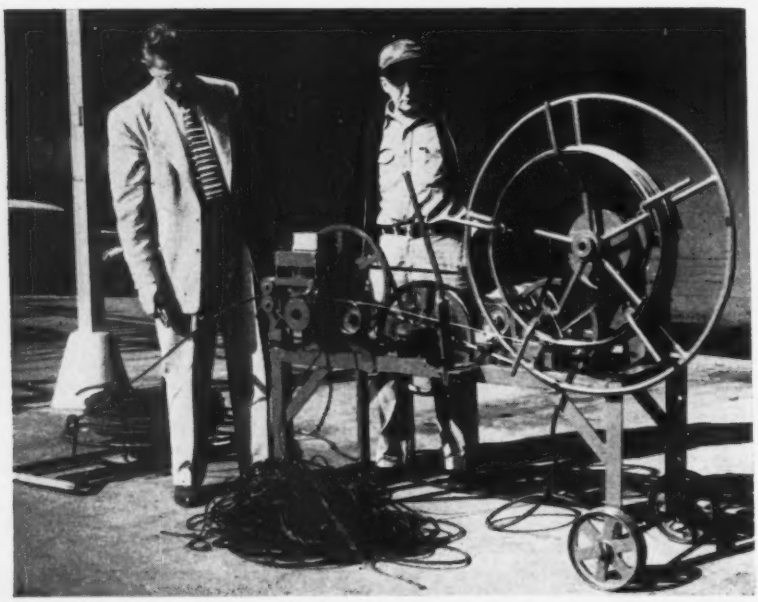
Two plates, supported on small channels, I-beams or angles, are tailored to fit the conveyor deck and roller spacing. They are held close to the belt and extend to within about ⅛ in. of rollers on each side. When coming down the chute with coal, a tramp-iron bar may still pierce the belt but will slide on the plate until it is carried to a horizontal position and then up the belt. A hole in the belt is the only damage that can occur.

Previously, ripping of conveyor belts occurred whenever a tramp-iron bar fell down the feed chute, pierced the belt and lodged against the steel work. Often a long section of belt was torn before the mishap was detected and the conveyor could be stopped.



PROTECTOR PLATES take impact of tramp iron and deflect it to avoid slitting of belt

Wire Stripper Pays for Itself in First Few Days



GYPSY ROSE LEE, wire stripper, was designed and built by Don Vanderzyl (left), purchasing agent, and Bill Williams, shop foreman, to reclaim Nos. 4 and 6 solid copper WP conductors

JACK SHEPARD, Engineering Supervisor, Electric Light Dept, Riverside, Calif.

Old weatherproof copper wire that became frayed and festooned is stripped of insulation and returned to service as bare conductor with the aid of a stripping machine designed and built by Riverside Electric Light Dept. In terms of cost of new bare conductor reclaimed from old wire with low salvage value, the device practically paid for itself in first few days of operation. Total cost of machine was about $250.

Stripping device is designed to handle No. 4 and No. 6 solid conductor. It consists of a ½-hp used motor, an old power take-off, five new pulleys, four new drive belts, an old inner-tube hot-patching vise, and two roller type dies. This equipment is mounted on an angle-iron frame made from scrap material and fitted with iron wheels for portability. Wire take-up reel is mounted on a clutch assembly that compensates for change in reel speed as coil of bare conductor builds up. Conductor is positioned by hand-operated wire guide.

Insulation is stripped from conductor by passage through two power-driven roller dies spaced vertically to exact wire diameter. Insulation is crushed between the dies so as to split along top and bottom of conductor. It is then deflected down beside the machine while conductor is allowed

(*Continued on page* 138)

For Condenser Plates and Tubes... it's REVERE

Condenser plate for large steam power plant, ready to ship from a Revere mill.

In 1808 Paul Revere rolled the copper plates for the boilers of Robert Fulton's second and third steamships. Ever since then Revere has been a preferred source of supply for rolled non-ferrous plates. Today you will find Revere plates in marine and stationary condensers, heat exchangers, evaporators, feed water heaters and similar equipment in ships, chemical plants and refineries, public and private generating stations—wherever long service is essential.

Revere plates, like Revere condenser tubes, are available in all the customary alloys, shapes and sizes. For collaboration in selection of the most durable alloy, consult Revere.

And write on your company letterhead for a free copy of a most informative booklet: "Life Extension for Condenser Tubes."

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

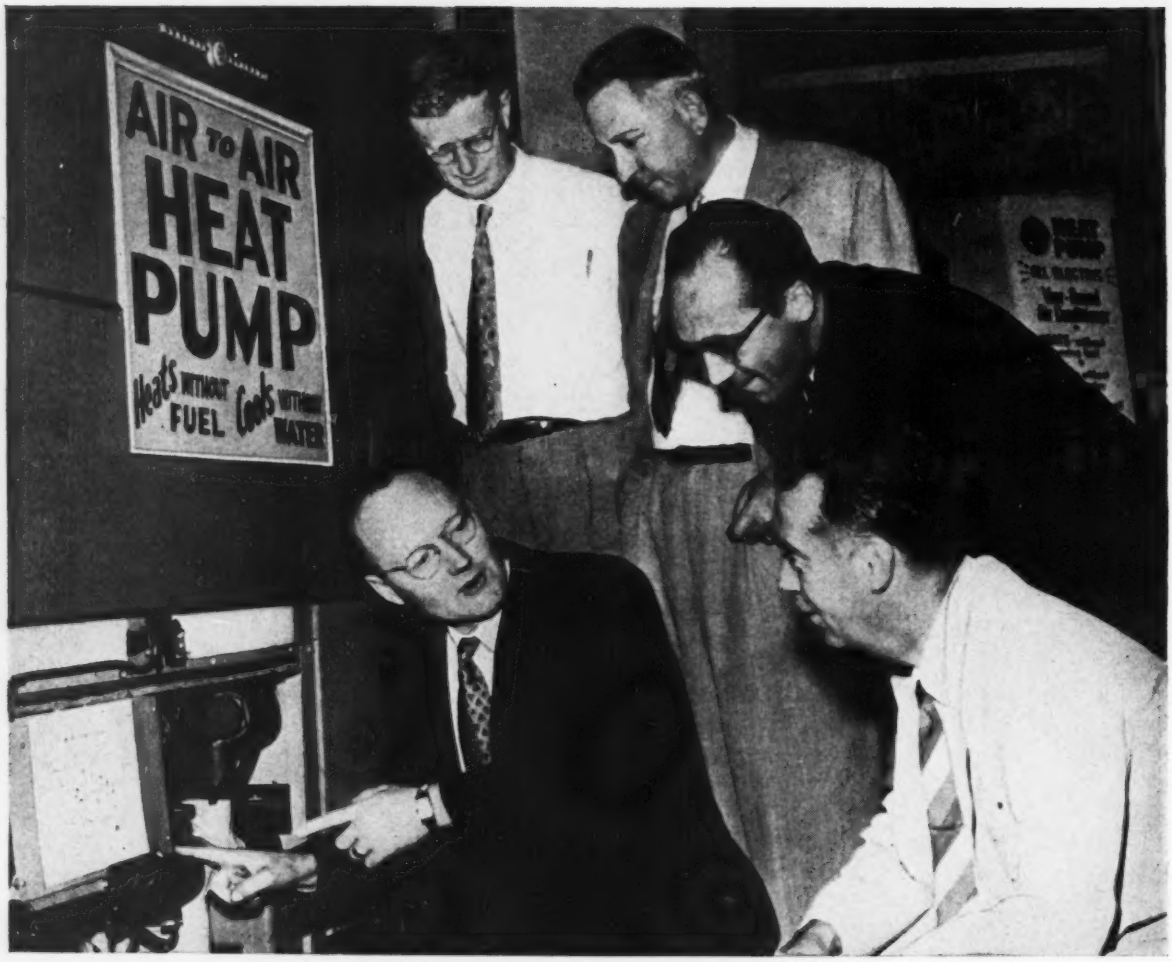
230 Park Avenue, New York 17, N. Y.

• • •

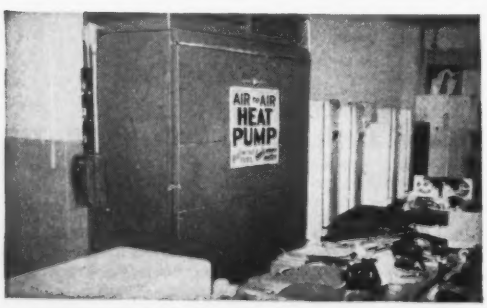
Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere.

SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION, SUNDAYS

Georgia Power Promotes



GEORGIA POWER COMPANY Sales and Operating Department staff members recently held a sales and training session in Atlanta with a G-E Heat Pump representative and local G-E distributor. Left to right, are: T. W. Thompson, Jr., President of the Thompson Company, G.E. Heat Pump distributor in Georgia; R. E. L. Shirley, Georgia Power Field Supervisor of Distribution; W. D. O'Brien, General Appliance Repair Superintendent, Georgia Power Company; P. F. O'Neill, G.E. Manager of Utility Contacts; and C. M. Wallace, Jr., Georgia Power Sales Manager.



GENERAL ELECTRIC AIR-TO-AIR HEAT PUMP units have been installed in each of the Georgia Power Company's four Atlanta branch offices. The Heat Pumps—in full operation—are prominently displayed in rooms open to the public where their operation and advantages can be explained to prospects and other persons interested in the equipment. At left is one of the Heat Pumps installed in West End store.

HEAT PUMP
ALL-ELECTRIC YEAR-ROUND AIR CONDITIONER

Use of the HEAT PUMP

Another major power company recognizes the potential of the Heat Pump.

GEORGIA POWER'S C. A. COLLIER, *Vice-President in Charge of Sales, says:* "The Georgia Power Company—like many other utilities throughout the nation—is playing a prominent role in heat pump research and promotion.

"Through the Southeastern Electric Exchange—an electric company trade association with headquarters in Atlanta—Georgia Power has helped to underwrite the costs of heat pump research carried on by the Southern Research Institute in Birmingham. Out of these studies have come data which have confirmed the Company's faith in the heat pump as an electrically powered device of tremendous importance.

"Several of the Georgia Power Company's engineers have received technical instruction from General Electric on the functioning and applications of the air-to-air heat pump. These men are in turn imparting this specialized knowledge to others who work within the sales department of our Company. The corps of engineers familiar with the heat pump who have thus been developed have rendered valuable assistance to prospects and to the local General Electric heat pump distributor.

"With heat pump installations in Georgia becoming more numerous, efforts are also being made within our Company to familiarize our servicemen with the new problems the heat pump will bring to appliance repair operations.

C. A. COLLIER, VICE PRESIDENT, GEORGIA POWER COMPANY

"Unquestionably, the heat pump offers great promise to the utility industry as a load-builder. Every effort will be made by the Georgia Power Company to promote its use as widely as is feasible."

Why Utilities Are Promoting the Heat Pump:

Using Only Electricity and Air, the General Electric Heat Pump cools in summer without water and heats in winter without burning fuel. It cools by refrigeration and heats by reversing the refrigeration cycle—it's the ideal year-round air conditioner.

True All-Electric Living is now a practical, every-day reality for the first time. The G-E Heat Pump gives utilities a unique opportunity to tie in the theme of all-electric living with the booming post-war trend toward entire-house, year-round air conditioning.

Normal Residential Power Consumption in the average all-electric home should triple or quadruple through the use of the G-E Heat Pump. It means increased kilowatt hour sales throughout the year.

For More Information about the G-E Heat Pump, including technical data and promotional literature, or plans for a co-operative promotional program, send the coupon or write on your letterhead to General Electric Company, Heat Pump Department, Air Conditioning Division, Sec. EW-5, Bloomfield, New Jersey.

Availability

The G-E Heat Pump is now available in selected areas, principally in the south, southwest, and on the west coast. It will be made available in other parts of the country as soon as distribution and service facilities are established.

GENERAL ELECTRIC

General Electric Company, Air Conditioning Division, Heat Pump Department, Sec. EW-5, Bloomfield, N. J.

☐ Please send me technical and promotional data on the G-E Heat Pump.

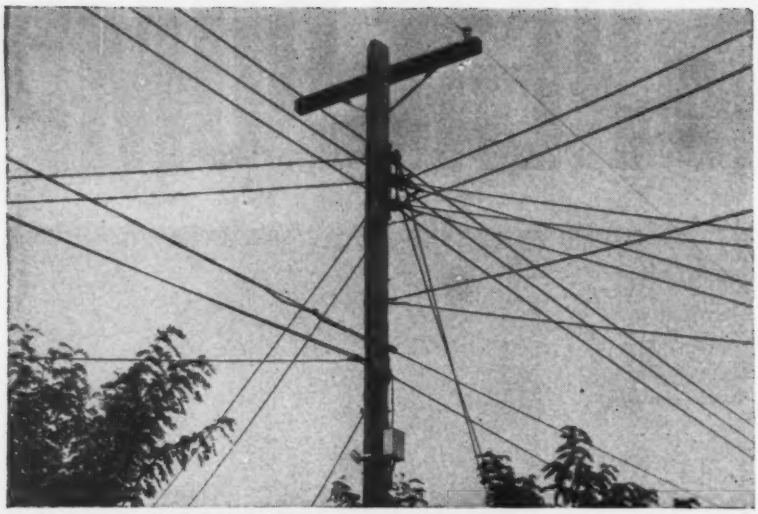
☐ Please contact us to discuss your plans for Heat Pump promotion in our service area.

Name and Title.....

Company.....

Address.....

City.....**State**.....



"Our Koppers Poles are still sound after 24 years' service,"

says S. R. Blakeman, Supt., City Water & Light Dept., Dyersburg, Tenn.

Koppers Pressure-Creosoted Pole being admired by S. R. Blakeman, Supt., City Water & Light Department, Dyersburg, Tennessee.

• "In 1928," Mr. Blakeman reports, "we used Koppers Poles on a particular job in our system. They were the only pressure-creosoted poles used on this job; some untreated poles were used, too.

"Now, 24 years later, all the untreated poles are gone, but the Koppers Poles in line today are still sound. Some have been retired where longer poles were needed, but they were put to use again in other parts of our system. I do not recall where any of the treated poles had to be replaced because of rot or decay."

This shows the kind of service utility companies are getting from Koppers Full-Length Pressure-Creosoted Poles. Specify these durable poles and you'll get this money-saving service, too.

KOPPERS COMPANY, INC.
WOOD PRESERVING DIVISION
PITTSBURGH 19, PENNSYLVANIA

KOPPERS

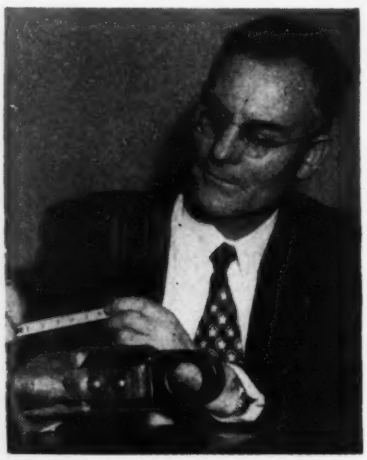
PRESSURE-CREOSOTED WOOD

Wire Stripper

(*Continued from page* 134)

to pass through a slot in deflector plate. Separate deflector plates are used for each size of conductor.

After insulation is stripped off, the conductor is wound on a take-up reel which is tapered to allow easy removal of coil. The patching vise clamps conductor without damage to maintain tension on reel while new length of wire is spliced onto end of conductor.



CABLE PULLING EYE is made from 2-in. hexagon steel and if assembled with ⅜-in. round-headed screws has an over-all diameter of 3 in. If assembled with flat-headed screws, diameter is only 2¾ inches

Cable Pulling Eye Saves Money

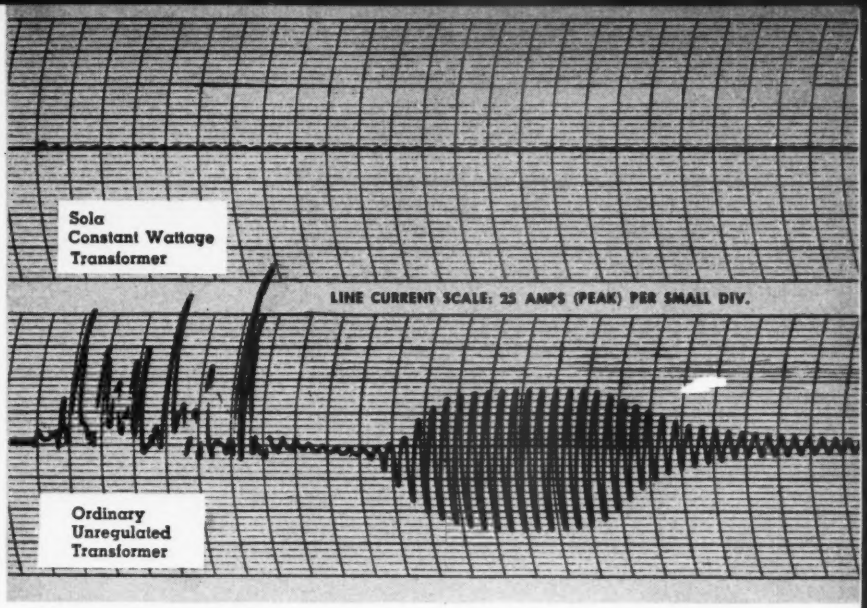
H. SORENSON, Underground Engineer, Wisconsin Electric Power Company, Milwaukee

A special pulling eye permitted Wisconsin Electric Power Co to install triplex cable in small ducts and manholes that were constructed years ago and did not provide sufficient space for pulling eyes supplied by the cable manufacture. Savings on one manhole enlarging job was $18,000 and digging new pavement was avoided.

The new puller was made from 2-in. hexagon steel. It has a diameter of 3 in. when assembled with ⅜-in. round-head screws, and 2¾ in. if flat-head screws are used. Pull-out tests indicate a maximum strength of 16,800 lb with round-head screws and

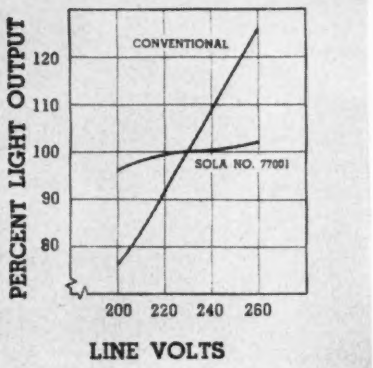
(*Continued on page* 142)

REGULATED INDOOR BALLAST for Type H1 Mercury Vapor Lamps. Unit has ½" and ¾" knockouts, large access panels to roomy wiring compartments, and is designed for wall or ceiling mounting. Outdoor constant wattage transformers for industrial and commercial floodlighting and premium quality conventional indoor units are also available.



NEGLIGIBLE STARTING CURRENT SURGE of Sola Constant Wattage Transformer is illustrated by the top tracing. The bottom tracing illustrates the heavy starting current surge of the ordinary unregulated transformer. Regulated current characteristic reduces installation costs by permitting use of smaller capacity circuit breakers, wiring and other equipment. On incandescent-to-mercury-vapor conversions, low starting surge current permits maximum use of existing wiring and switching gear.

Mercury Vapor Lamps Operate At *FULL RATED LIGHT OUTPUT* with Sola CONSTANT WATTAGE Transformers



LIGHT OUTPUT REGULATION of EH-1 Mercury Vapor Lamp with Sola Constant Wattage Transformer No. 77001 and a conventional autotransformer type. Regulation under high voltage conditions extends lamp life by restricting lamp operations within rated values. Nominal light output is maintained under low voltage conditions.

You get all the lumens you pay for when your mercury vapor lamps operate from Sola Constant Wattage Transformers. These regulated ballasts will continuously and automatically supply constant wattage within ±2% regardless of line voltage fluctuations as great as ±13%.

In addition to the maintenance of light output, they have the following advantages over the ordinary unregulated type:

- **Eliminates any need for primary voltage taps.**
- **Assures positive starting within the primary voltage (±13%) range.**
- **Reduces installation cost because of negligible (5 amps) starting current surge.**
- **Virtually eliminates lamp outages due to line voltage drops.**
- **Long transformer life, since the ballast is self-protecting and actually runs cooler (approx. 34°C) on open circuit.**

WRITE FOR BULLETIN Z-MV-166 FOR COMPLETE DATA

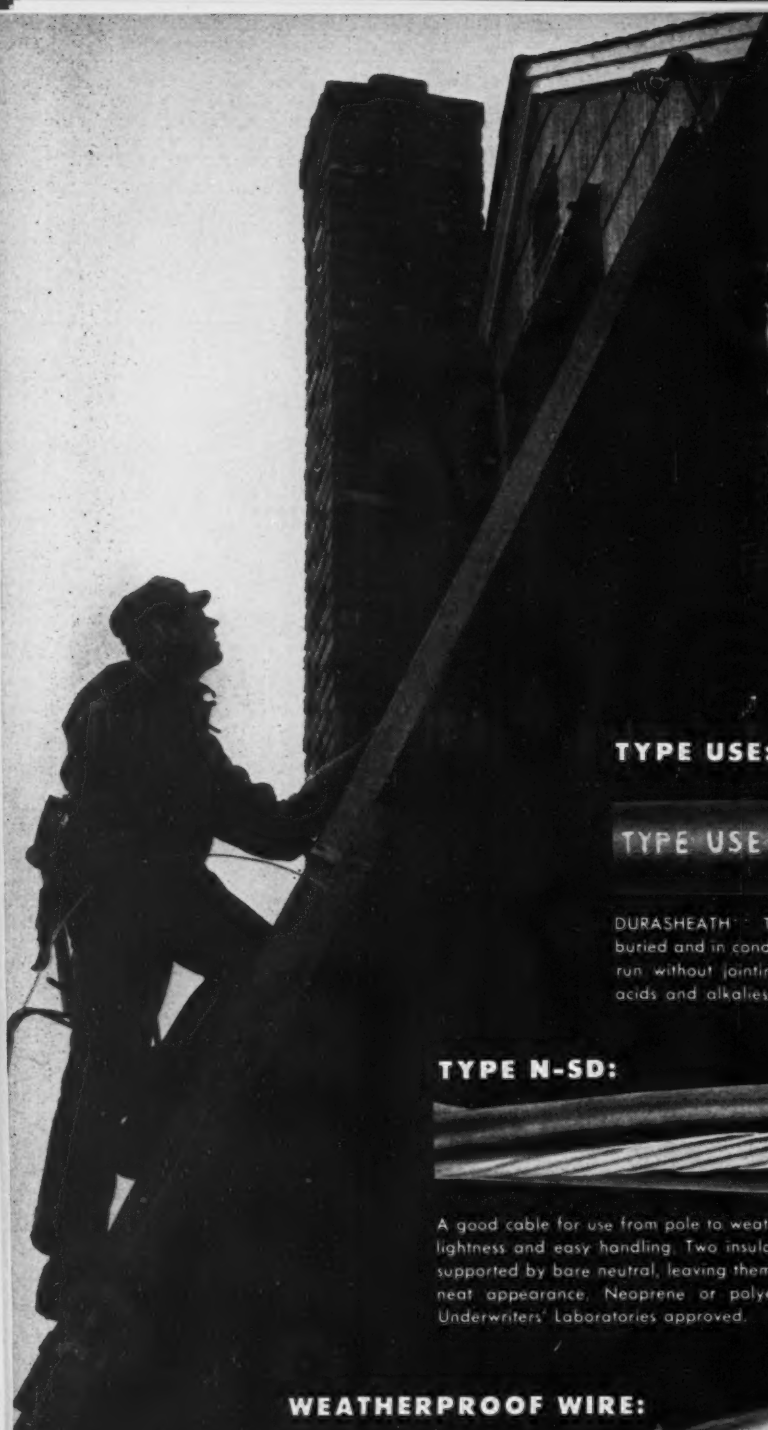
Regulated Outdoor

Regulated Indoor

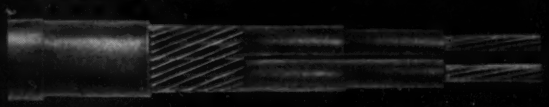
Conventional Indoor

SOLA *Mercury Vapor Lamp* **TRANSFORMERS**

Transformers for: Constant Voltage • Fluorescent Lighting • Cold Cathode Lighting • Mercury Vapor Lighting • Luminous Tube Signs
SOLA ELECTRIC CO., 4633 W. 16th Street, Chicago 50 Illinois, Bishop 2-1414 • *NEW YORK 35: 103 E. 125th St., TRafalgar 6-6464*
PHILADELPHIA: Commercial Trust Bldg., Rittenhouse 6-4988 • *BOSTON: 272 Centre St., Newton 58, Mass., Bigelow 4-3354*
CLEVELAND 15: 1836 Euclid Ave., PRospect 1-6400 • *KANSAS CITY 2, MO.: 406 W. 34th St., Jefferson 4382* • *Representatives in Principal Cities*



TYPE SD:



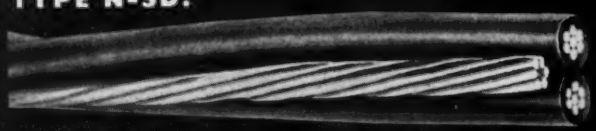
This practical cable is moderately priced for use from pole to weatherhead . . . and from weatherhead to meter if in conduit. URC saturated and finished. Weather-resistant outer braid. Can be painted after installation without discoloration of the paint. Underwriters' Laboratories approved.

TODAY'S

TYPE USE:

DURASHEATH** Type USE may be installed aerially, directly buried and in conduit—from pole top to meter—in one continuous run without jointing. Neoprene jacket resists sunlight, oils, soil acids and alkalies. Underwriters' Laboratories approved.

TYPE N-SD:



A good cable for use from pole to weatherhead. Linemen like its lightness and easy handling. Two insulated conductors are fully supported by bare neutral, leaving them free of tension. Presents neat appearance. Neoprene or polyethylene insulation. Not Underwriters' Laboratories approved.

WEATHERPROOF WIRE:

DURALINE'S** unique construction—an exclusive continuous interlocked fibrous sheath, thoroughly impregnated with URC saturants, then covered with URC finishers—provides finest weatherproof performance and service dependability. It won't festoon, gives best insurance against bad weather. (Section of Duraline is shown with covering unsaturated to indicate construction clearly.)

**Reg. U. S. Pat. Off.

ANACONDA WIRE & CABLE COMPANY, 25 BROADWAY,

TYPE SE:

SILVALINE*—the aristocrat of service cables—may be run from pole to weatherhead and without conduit to meter and fuse box and to such appliances as ranges, water heaters, etc. URC saturated and finished. Smooth outer braid coated with silvery paint for a superior finish. Can be painted after installation without discoloration of the paint. Underwriters' Laboratories approved.

*Trade Mark.

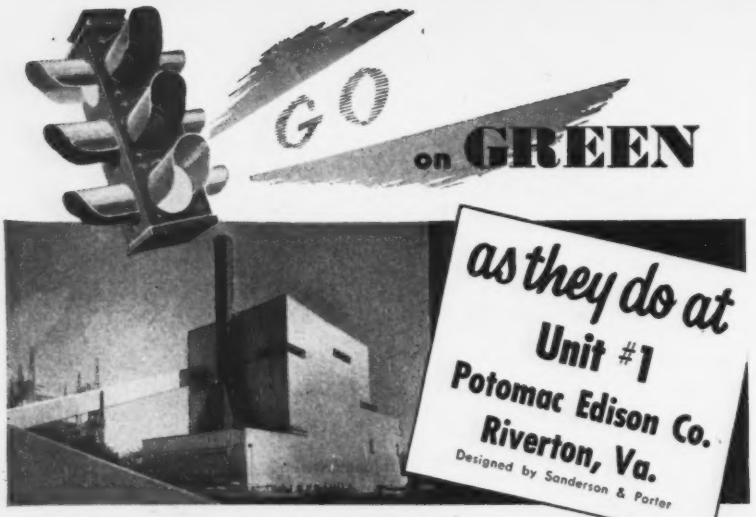
HEADQUARTERS FOR SERVICE CABLE

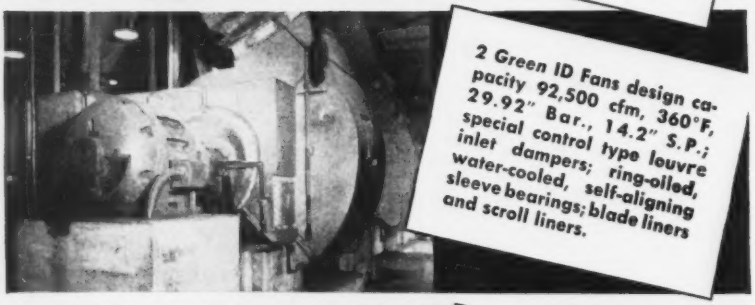
ANACONDA

service and overhead distribution cables, bare and weatherproof, including ACSR • signal, control and communication wire • portable cords and cables • network cables • airport and street lighting cables • mine cables • magnet wire • copper, aluminum and copperweld conductors • wire and cable accessories

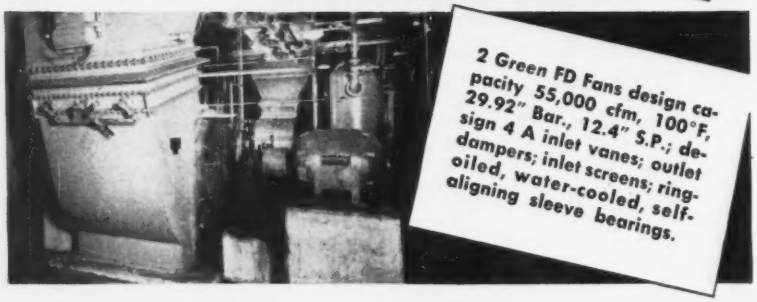
● *All AnacondA Service Cables are available with copper or aluminum conductors. Ask your Anaconda Sales Office for complete information.*

NEW YORK 4, N. Y.





2 Green ID Fans design capacity 92,500 cfm, 360°F, 29.92" Bar., 14.2" S.P.; special control type louvre inlet dampers; ring-oiled, water-cooled, self-aligning sleeve bearings; blade liners and scroll liners.



2 Green FD Fans design capacity 55,000 cfm, 100°F, 29.92" Bar., 12.4" S.P.; design 4 A inlet vanes; outlet dampers; inlet screens; ring-oiled, water-cooled, self-aligning sleeve bearings.

The list grows—the list of utility and industrial steam generating plants for which Green Fans were selected to provide the air necessary for combustion purposes.

Draft fans yield to no other equipment in their importance to efficient steaming. They must be properly designed for the requirements in each plant respectively. They must be conservatively rated. And they must be durably constructed.

Green Fans fulfill these basic requirements. You wouldn't find them in so many large utility plants and large industrial plants unless they had thoroughly proved their worth.

Our Catalog No. 168 tells all about Green Fans. Write for a copy.

THE GREEN Fuel Economizer COMPANY INC.

- Economizers
- Fans
- Air Heaters
- Cindertraps
- Aerodyne Dust Collectors

BEACON 3, NEW YORK

Cable Pulling Eye

(*Continued from page* 138)

13,460 lb with flat-head screws. Normal pull-in force on a 400-ft cable span is about 1,900 lb.

Cable manufacture's pulling eye is 3¾ in. in diameter and was too large for the 3½-in. ducts that were existing in the old installation.

DETECTOSCOPE is combination current indicator and hook stick for 2.3 kv to 15 kv

Device Detects Current in Disconnect Switch

H. A. DILBERGER, Engineer of Substations

E. T. MELDRIN, Supt of Substations
East Bay Division, Pacific Gas & Electric Co, Oakland, Calif.

Positive evidence that current is flowing in single-pole disconnect switches and indication of whether it could be interrupted without hazard is provided by a Detectoscope designed and built by the authors. Device is a combination current indicator and hook stick, and accommodates voltages from 2.3 kv to 115 kv. Another use for it is tracing routes of non-metallic cable in nonmetal ducts buried under a floor or in a wall.

Detectoscope consists of an ammeter mounted in a plastic head that also holds a wire-wound pickup coil. Through center of the pickup coil is a short bolt or hook which fits into eye of disconnect switch. Below the ammeter is a neon glow-tube located at the base of a long plastic tube. This tube shuts out light so that

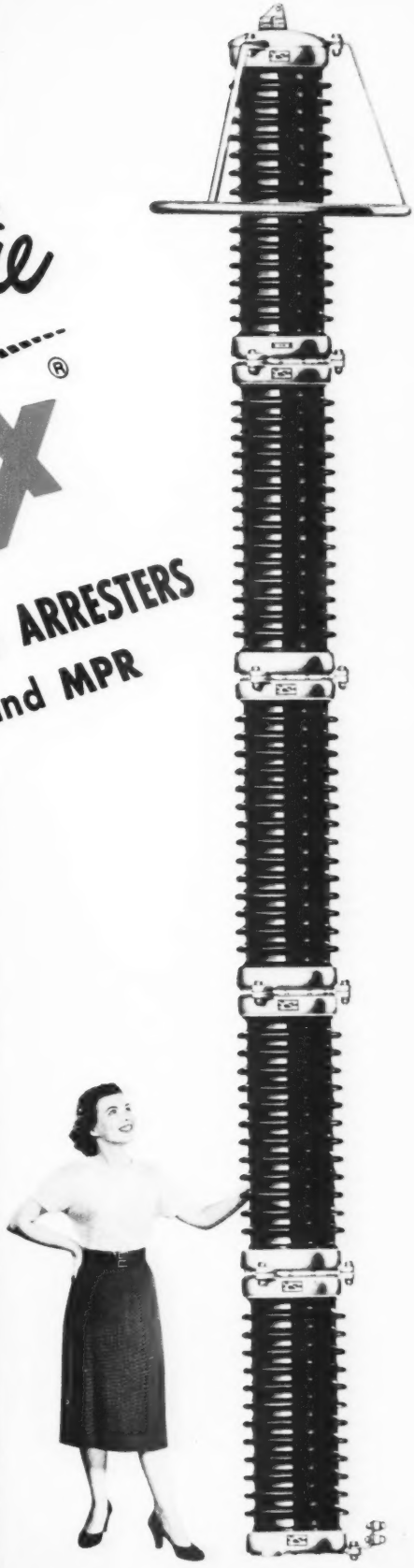
(*Continued on page* 147)

HI-TENSION NEWS *Junior*

Announcing the THOREX®

MULTI-PURPOSE LIGHTNING ARRESTERS

in types MP-A, MP and MPR



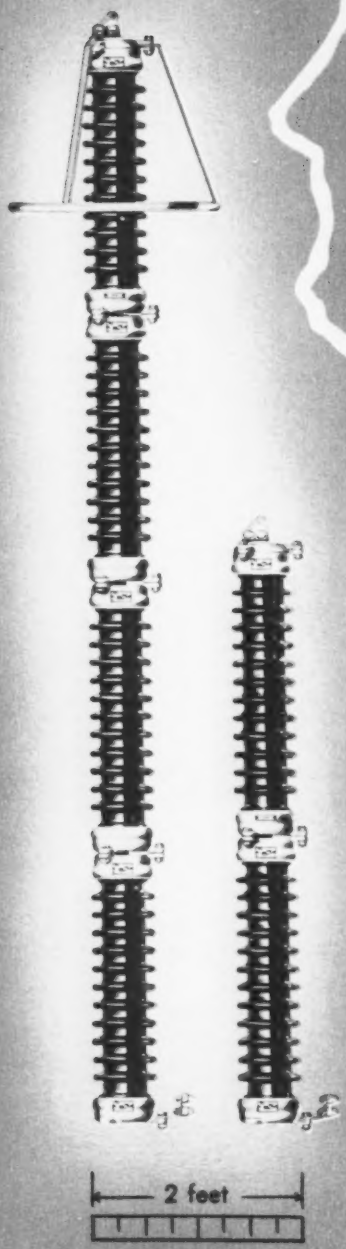
Now you are offered the Most Protection ever put into a Lightning Arrester!

Ohio Brass

MANSFIELD, OHIO, U.S.A.

Not just a little more protection

...MUCH MORE!



Examples of Thorex Type-MP arresters. The larger size, on the left, is rated at 121 kv, for application to 138-kv grounded systems.

Modern system requirements for lighting and surge protection have developed entirely new conceptions of lightning arrester performance. Such performance is now embodied in the new Multi-Purpose Thorex. The finest order of apparatus protection is provided by new, lower maximum IR discharge voltages combined with extremely heavy-duty thermal capacity. Precise and positive protection is now available from 3 kv to the highest Super-Power voltages now in existence, and may be extended to satisfy future, even more severe, requirements.

A somewhat dramatic evaluation of this new design is found in the fact that, for a given total surge current discharge, two General-Purpose (Type-GP) Thorex arresters, or comparable station protective devices, connected in parallel, would be required merely to approach the low protective performance of a single new Multi-Purpose Thorex discharging the full current.

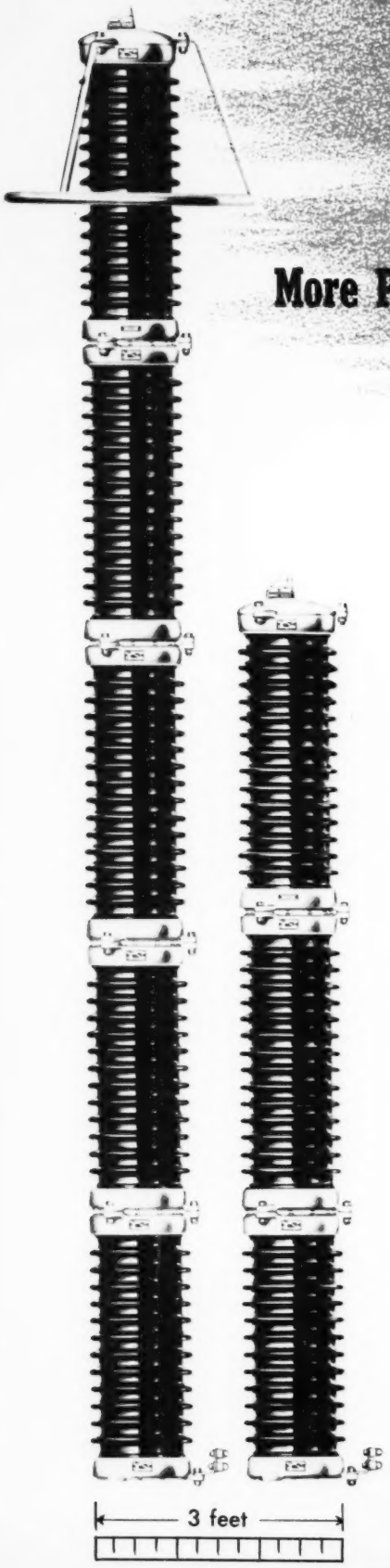
While following the traditional principle of a valve type lightning arrester, modern developments and extensive new research have been applied to the various elements used in the new arrester. Basic improvements in composition and manufacture of valve blocks have included low, consistent IR discharge capability coupled with very heavy thermal capacity. Combined with these improved blocks is a rugged spark gap of unusually high interrupting ability, but with precision sparkover performance. One of the most traditional and universally-used methods of arc extinction has been incorporated into a new approach to arrester spark gap design.

A feature of considerable interest, especially in the higher voltage ranges, is the simple, single-column form of the Multi-Purpose Thorex, capable of self-support throughout its entire range of ratings. This eliminates the design and operating problems, and high cost of auxiliary supporting structures and insulation.

To satisfy a demand for greater protection than has ever previously been put into a lightning arrester—not just a little more, but much more—the Multi-Purpose Thorex lightning arrester is now presented to the Electrical Industry.

HI-TENSION NEWS *Junior*

More Protection, Self-Support, Maximum Long-Wave Discharge Capacity, All Combined



Thorex Type-MPR arresters are applicable to line voltages including extra-high-ranges beyond 300 kv, for which the size on the left is intended.

Increased voltage and size of transmission networks, large underground high voltage cable installations, and the growing use of large banks of condensers for power factor correction, have created a demand for a type of lightning arrester capable of discharging low-current, long-duration surges, in addition to dealing effectively with natural lightning. To meet such requirements, the new Multi-Purpose Thorex arrester is offered in three arrangements. These new arresters pass not only with complete ease but with a generous reserve, all American Standards for the heaviest station duties, and anticipate the added requirements which modern demands may impose on arresters for future heavy-duty service.

Especially noteworthy in arresters for operation at the higher voltages is the self-supporting feature of the new Multi-Purpose Thorex. A simple column of high inherent cantilever strength not only conserves space and improves appearance, but also eliminates all supporting structures, insulated bracing, and special foundations, whose design and construction constitute a major item in installed arrester cost.

Another modern development of great value in many applications is a special measure employed in the higher voltage ranges to insure equal voltage division between the several units, so that no unit is subjected to voltage in excess of rating. Not only is this feature unique, but it is particularly helpful where heavy contamination conditions promote excessive surface leakage currents which affect internal electrical grading of the stack. Such arresters are safely applied in concentrated industrial districts which have heretofore had an adverse effect on arrester operation.

Under all conditions, the Multi-Purpose Thorex offers these protective advantages: (A) Lowered average IR discharge values. (B) Lowered maximum IR discharge values. (C) IR discharge voltage tolerance of + 5 per cent, or less. (D) Series gap sparkover voltage tolerance of + 10 per cent, or less. The combination of these elements produces a new low order of wide protective margins. Importance of this fact cannot be over-emphasized, as apparatus protective margins can be realistically measured only between arrester maximums and the existing insulation strength of protected equipment.

For systems where it is desirable to use a full-rated or 100 per cent arrester, but where requirements call for a better grade of protection, the superior ability of the Thorex Multi-Purpose arrester offers a welcome solution. This arrester provides protective levels heretofore associated only with 80 per cent devices, yet retains its 100 per cent rating and corresponding durability.

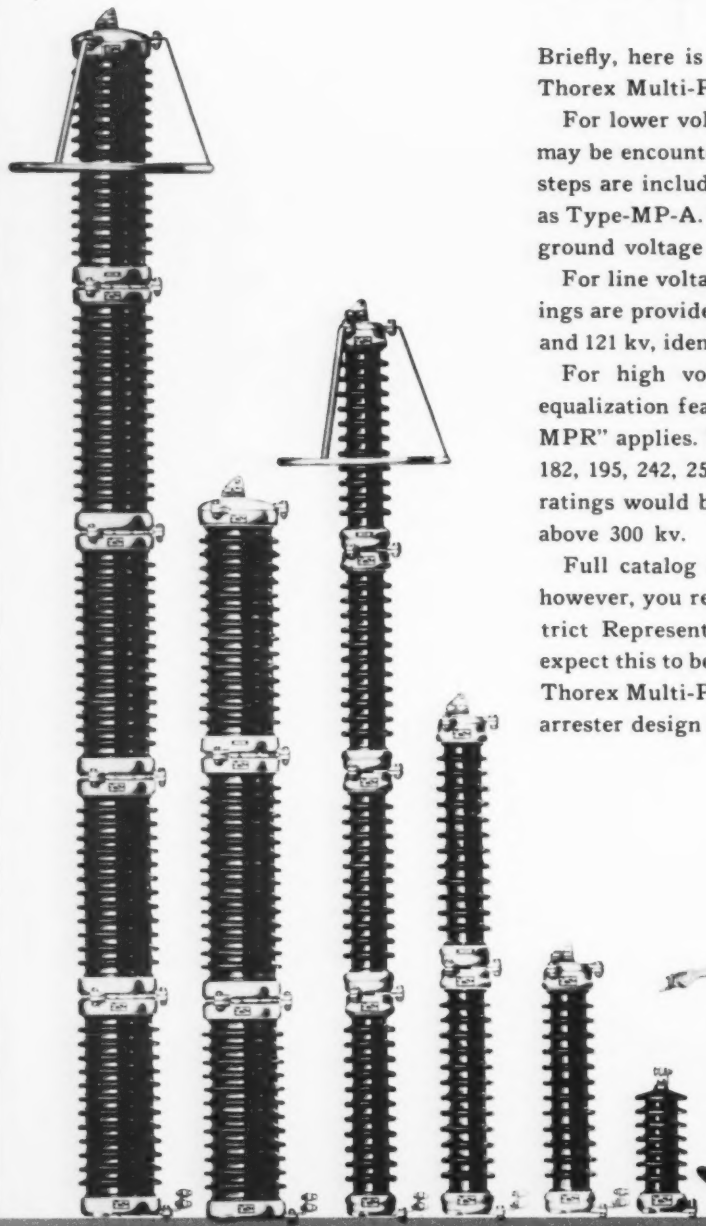
Ohio Brass

MANSFIELD OHIO, U. S. A.

Detects Current

HI-TENSION NEWS *Junior*

MULTI-PURPOSE THOREX ARRESTERS offered in *Three Types* to aid correct application



A few examples of the range of 37 Thorex MP models rated from 3 kv beyond 300 kv—self-supporting throughout. For lower voltages, porcelain top types permit close spacings.

Briefly, here is the line-up of types and ranges included in the Thorex Multi-Purpose series:

For lower voltages, especially where close mounting clearances may be encountered, as in the case of enclosures, seven graduated steps are included in a group of porcelain-head models identified as Type-MP-A. These steps are 3, 4.5, 6, 7.5, 9, 12, and 15 kv line-to-ground voltage ratings.

For line voltages up to 138 kv, the following line-to-ground ratings are provided: 20, 25, 30, 37, 40, 45, 50, 60, 73, 79, 85, 90, 97, 109, and 121 kv, identified as Type-MP.

For high voltage, and incorporating the automatic voltage equalization feature previously discussed, the designation "Type-MPR" applies. This range includes: 90, 97, 109, 121, 133, 145, 169, 182, 195, 242, 250, and 276 kv, line-to-ground voltage. The higher ratings would be applicable to present system operation voltages above 300 kv.

Full catalog information is in the process of distribution. If, however, you require more details on this arrester, your O-B District Representative will gladly supply the desired data. Don't expect this to be the story of "just another lightning arrester." The Thorex Multi-Purpose has established a new conception of modern arrester design and superior apparatus protection.

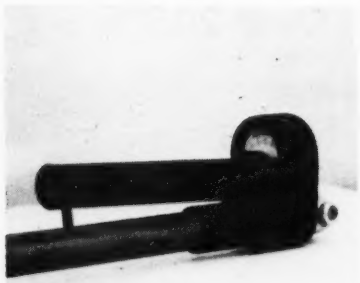
Ohio Brass

MANSFIELD, OHIO, U. S. A.

4397-H

Detects Current

(*Continued from page* 142)



HOOK END of device contains wire-wound pick-up coil which energizes ammeter in head and also neon glow tube at base of shield

tube may be seen when energized even in daytime.

All components are mounted on one end of a treated switch stick of proper insulating length for voltages to be encountered. Size and location of components have been chosen so as to provide maximum clearances between device and nearby cell walls or other equipment whenever a switch is being checked.

Use of the device is quite simple. Hook is inserted in eye of switch to check for current flow. If sizable current is flowing, there will be a heavy swing of ammeter needle even before hook is inserted in the eye. Authors suggest a check be made of circuit conditions if heavy current is indicated. If no current is indicated with hook in eye, switch may be opened safely. However, where no current flow is evidenced, it has been found desirable to place hook momentarily behind disconnect blade at upper or lower end as an additional check. This puts instrument at point of maximum flux and assures indications of smaller currents.

Blade or clip of switch may be proved de-energized by testing with neon glow-tube. Condition of tube may be proved on known energized source as an additional check. Because flux surrounding disconnect blade is non-uniform, it was decided not to calibrate ammeter but to rely upon needle swing for indications of large or small currents.

Detectoscope is being made, sold, and marketed commercially by Western Electro Mechanical Co, Oakland, Calif.

the
PFAFF & KENDALL
story in
Levittown, Pa.

20 Ft. pedestal type standard with special P & K tapered lighting arm used for the first time. At Levittown, Pa.

Levittown, Pa. is a very *special* town in many ways! It is completely pre-planned for 16,000 homes to be ready in December 1954 . . . together with churches, schools, shopping centers and playgrounds so vital to the residents of what will be Pennsylvania's 10th largest city!
Street lighting will be really something to see . . . *and see by!* Underground wiring . . . anti-glare reflectors . . . photo-electric cell relays to turn lights on or off with sunset and sunrise . . . *and more than 3,000 PFAFF & KENDALL All-Aluminum Standards and Brackets to carry more than 650,000 candlepower of light!* Arterial highways will get similar lighting treatment.

FOUR GOOD REASONS WHY P & K ALL-ALUMINUM STANDARDS AND BRACKETS WERE SELECTED:

- ***Much lighter weight* for low installation cost**
- ***Negligible corrosion* for longest life**
- ***No painting required* means large, long time savings**
- ***Knock-downs are easily salvaged and re-used***

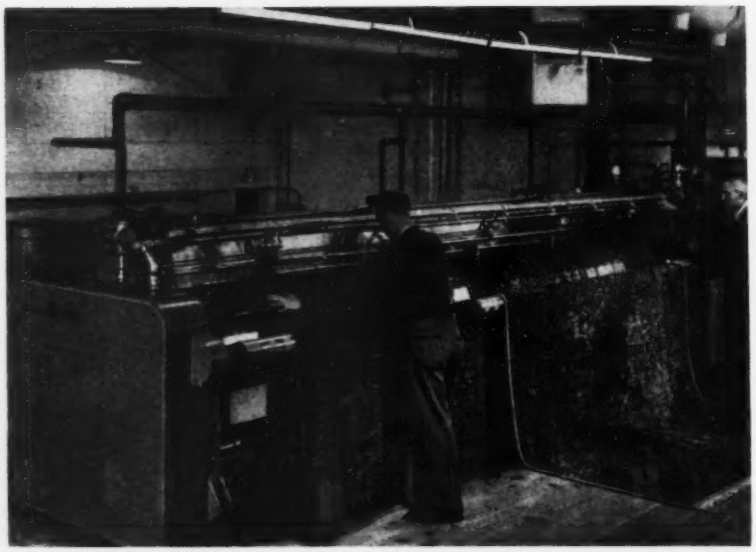
WRITE FOR LATEST P & K CATALOG . . . USE THE P & K PLANNING AND ADVISORY SERVICES WITHOUT OBLIGATION.

Pfaff & Kendall
84 Foundry Street
Newark 5, New Jersey

INDUSTRIAL APPLICATIONS

Rug Cleaning Machine Increases Production Over 200%

CLARK T. BALLARD, Power Engineer, Cincinnati Gas & Electric Co

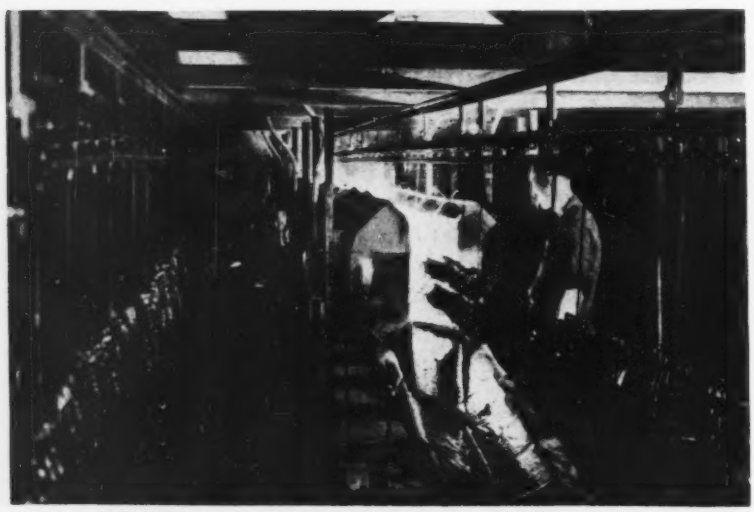


RUG CLEANING MACHINE and special conveyor equipment automatically scrubs, washes, rinses, sizes, dries and wraps 35 rugs in 2 hr

The Security Rug Cleaning Co., Cincinnati, Ohio has converted their concern into a fully automatic operation of rug cleaning by installation of one of the most modern rug cleaning machines. By installation of special conveyor equipment, they are able to handle the output of this machine to increase production well over 200%.

The new rug cleaning machine is fed at one end by two men and rugs pass directly underneath moving brushes that may be raised or lowered automatically as to thickness of rug. These brushes scrub rugs with a soap compound as they pass underneath. The rugs then travel through the machine and are fully washed and rinsed. As the rugs leave the washing machine, they are placed upon a conveyor by two men who then size the rugs before they are carried through a drying room. At the end of the drying room, rugs are then automatically dropped on a conveyor which carries them into an adjoining room where they are automatically placed on a different conveyor which brings them up to an inspection table and the wrapping machine. The rug cleaning machine and conveyor system requires 15-hp, 3-phase, 220-v equipment. The company is very well satisfied with the economy obtained from the use of the electrically operated equipment.

Infrared Paint Drying Saves Floor Space



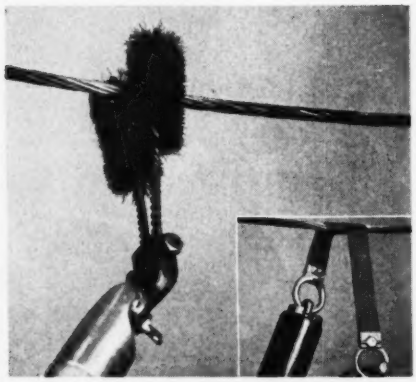
CEILING-HUNG infrared tunnel for drying paint on outlet boxes releases floor space formerly occupied by fuel-fired oven. Process is speeded up materially

E. M. WENNER, Industrial Representative, Duquesne Light Co, Pittsburgh

Drying asphalt paint on electrical outlet boxes with a ceiling suspended infrared oven at the National Electric Products Corp, Ambridge, Pa. has saved considerable valuable floor space at comparatively low cost. Increased production and a better product is obtained, compared with that of the formerly-used fuel-fired oven.

Painting of the outlet boxes is now a streamlined mechanical operation. They are placed on racks which are suspended on a conveyor chain which goes through a paint "dip", and then proceeds through the infrared tunnel where the boxes are thoroughly dried in 7 min. Then an operator simply removes them from the conveyor, a finished product.

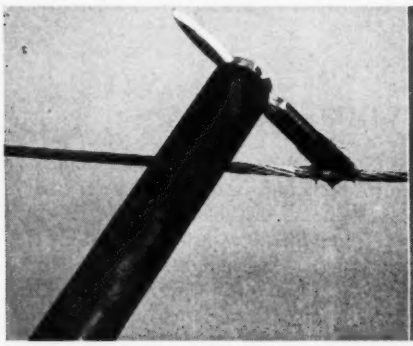
Two ways to add years of life to Tap Connections



Clean section of conductor where clamp will be applied. Use this wire brush (Cat. No. 4455-62). It fits on a Chance Universal Pole. Or, use a ring-fitted emery cloth (Cat. No. 4565). See inset.

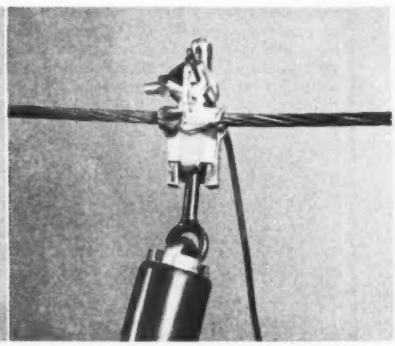
1 Treat contact surfaces to increase conductivity and reduce corrosion

For positive tap connections that will last longer—stay tight and troublefree even under unusually severe atmospheric or industrial conditions—have linemen make these simple preparations. You'll reduce maintenance and protect your conductors and tap clamps.



Then apply a good corrosion-resistant compound. You can use a brush, flat tool, or the emery cloth for this job.

Apply some compound to the contact surfaces of the tap clamp. This may be done on the ground.



Hang clamp on treated section of conductor. Tighten the clamp firmly and your long life connection is completed.

2 Install CHANCE AGP* Clamps to protect the connection

To get the most in long troublefree service use Chance Aluminum General Purpose Clamps. These aluminum clamps are heavily coated (.001) with high density cadmium. This surface is further fortified against electrolytic corrosion by a special process. The strong cast aluminum bodies are light in weight—easy on the conductor because they reduce conductor fatigue—easy to handle on a clamp stick. Contacts stay tight—the thermal expansion of the clamp is uniform with aluminum conductor . . . and since the thermal coefficient of copper is less than that of aluminum, the clamp will not deform copper conductor even under extreme temperature variations. The conductor is protected at all times.

Chance Aluminum General Purpose Clamps for aluminum or copper connections are multi-purpose clamps. They eliminate confusion in connector applications—reduce inventories—and simplify stocking problems. They are available in both the PC (Protected Connection) and Perma-Grip designs.

*CHANCE *Aluminum General Purpose — the Tap Clamp with the RED Eye Screw*

A·B·CHANCE CO·

CENTRALIA, MISSOURI
SAN FRANCISCO, CALIFORNIA

ANCHORS • GUYING FIXTURES • LINE CONSTRUCTION TOOLS • CONDUCTOR CLAMPS
GROUNDING EQUIPMENT • HOT LINE TOOLS • HIGH VOLTAGE SWITCHES • CUTOUTS

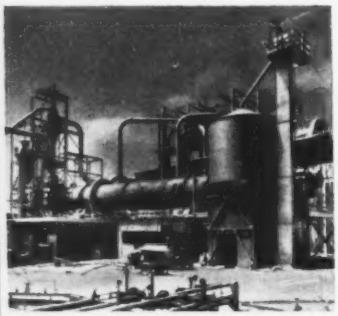
In addition to these two complete lines, Chance Parallel Groove Clamps are also available in cadmium-coated aluminum for general purpose connections.

C53-10

what's NEW in Engineering

The shortage of engineers in all fields, according to three leading universities, will continue until 1955 or 1956. Then, a more balanced supply and demand picture should emerge—thanks to heavy registration of engineering students in the past two years. Meanwhile, one major university reports that in June they had over 4,000 jobs on file—open to 260 graduates.

Microscopic sea plants, called diatomaceae, are getting a lot of attention at Lompoc, California. Deposited geologic ages ago on the floor of what was then an island sea, their fossils are highly valued in many industries for filtering, refining, and other processes. To utilize



the huge deposits at Lompoc, Kaiser Engineers recently designed and built one of the largest and most modern Dicalite plants in the nation for Great Lakes Carbon Corp. We'll send you a reprint of an article in *Industrial and Engineering Chemistry* which tells the story of Lompoc's diatoms.

Chi-Teh Wang, N. Y. U. aeronautical engineering professor, has written a book on a new approach to elasticity. To be published by McGraw-Hill in August, *Applied Elasticity* presents useful analytical and numerical methods of applying fundamental elasticity theories.

Did you know that Kaiser Engineers is noted for widely diversified engineering talents? Departments include civil, structural, electrical, mechanical, architectural, process and production, mining and geology, metallurgical and chemical—all prepared to work closely together on any project. When you have a problem in engineering, call or write Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, Calif.

UNIFORM HEAT provided by four radiant infrared heaters in sizing unit eliminates cracking or chipping and keeps candy pliable for easy cutting

Radiant Infrared Improves Candy

Heating hard candy rolls during drawing out process in the sizing unit with 1800-w of infrared radiant heaters at the Brock Candy Co., Chattanooga, Tenn., maintains uniform temperature of outer surfaces around 175 F and keeps them pliable for easy cutting without cracking or chipping.

Units are installed at point where heat is desired, are more sanitary and have high safety factor. Heat is instantaneous and units can be cut on and off when not needed. This is not possible when either gas or steam heat is used. The electric units concentrate heat where most needed to obtain proper penetration and a more uniform product.

INDUSTRIAL BRIEFS

Curing rubber insulation on wire with steam from a 30-kw electric steam boiler at Central Cable Corp, Jersey Shore, Pa saves space and has low maintenance costs and safety factor. Control and operation is simple. Harry Moore, Industrial Power Representative, Susquehanna Division, Pennsylvania Power & Light Co.

Handling and stacking larger size television tubes (24 and 27 in.) in factory warehousing is effectively solved at Newburyport, Mass. CBS Hytron plant by electric fork trucks (3,000-lb rating) operated on three 8-hr shifts per day. Palletized unit loads up to 1,600 lb are stacked as high as 21 ft. Twelve cartons, each carrying 1 tube specially cradled against vibration are carried per load. Smooth, vibrationless fork truck operation and absence of contaminating dust and gases is obtained. Storage batteries are removed for charging and replaced in about 90 sec at shift ends. Charging is done in 6.5 to 7 hr if battery is fully discharged, but normally battery capacity leaves power for further service at the shift end.

In Plant feeding on upper floor of Rathbone Hair & Ridgeway Box Co, Savannah, Ga., employs 600-w electric coffee urns, 5-kw range and 15-kw grill. Present success in employee good will and acceptance indicates need for additional facilities. C. D. Anderson, Power Sales Engineer, Savannah Electric Power Co.

Sealing plastic films used in wrapping tobacco cans, vegetables, etc., is accomplished at Western Products, Inc., Newark, Ohio, by use of a small platen electrically heated with cartridge type heaters. When the film

DOW

GOING UP EVERY DAY... PENTA TREATED SOUTHERN PINE POLES

Clean, modern wood preservative controls decay and termites, cuts repair costs and gives long life to all wood poles

The Dow Chemical Company
Dept. PE 3-2B8, Midland, Michigan.

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Southern Pine utility poles, pressure-treated with *clean* PENTA*, are giving top performance in many sections of the country. Year after year, under all weather conditions, in all types of soil, PENTA keeps these pine poles well protected against decay and termites.

You can count on low repair and replacement costs when you specify PENTA protection. Just as important, PENTA provides that necessary "extra"—*cleanliness*, important for settings in residential areas.

Specify *clean* PENTA for all your wood construction. Over 60 pole suppliers now treat with PENTA. Ask your regular supplier to give you a quotation on PENTA-treated poles and crossarms. THE DOW CHEMICAL COMPANY, Midland, Michigan.

*PENTAchlorophenol.

you can depend on DOW CHEMICALS

DOW

SHAWMUT'S NEW FORM 208 Amp-trap®

SAVES BOTH CIRCUIT *AND* CUSTOMER
(FOR 120/208 VOLT AC OR 125/250 VOLT DC NETWORKS)

POSITIVE PROTECTION AGAINST SUPERCURRENTS

Low voltage AC and DC networks give large utilities and their customers greater continuity of service and easy expansion of their systems. The only drawback to this type of network is the constant threat of danger from heavy short-circuit or fault currents. Shawmut's new FORM 208 Amp-trap eliminates this danger from these circuits. On actual test, its amazingly fast "chop-off" stops a short-circuit *even before it reaches the peak of its first ¼ cycle — even if the available peak current could reach* 560,000 *Amps!* It anticipates and prevents the destructive build-up of heavy fault currents so dangerous to office buildings, stores, hospitals, theatres, schools, etc. FORM 208 saves *both* circuit and customers.

USES & SPECIFICATIONS

Amp-trap FORM 208 is made for Entrance Switch Service, Underground Network Conductors, Distribution & Panelboards and other applications. It is built in Ampere ratings of 1000, 1200, 1600, 2000, 2500, 3000, 4000 and 5000 for Entrance Switch Service and for cable sizes from 4/0 to 1000 MCM. It runs "cool" and carries 100% of its rating with temperature rises less than those recommended in the Underwriters' Laboratories Standards for Fuses. The watt (power) loss is probably lower than for *any other over-current protective device*. Hence it may safely be installed in vaults and steel enclosures and subjected to long continued loads.

LOW IN COST — EASY TO INSTALL

FORM 208 Amp-traps clear fault currents long before they can burn or wreck bus bars and switch gear. Yet they are small in size, low in cost and easy to apply. They have a variety of mountings for flat, bus or tubular connectors. Adapters can be supplied for switch cubicles now equipped with copper or aluminum alloy links. FORM 208 is the "little brother" of the famous FORM 600 Amp-trap which has long been used so successfully on 600 volt circuits. Write today and find out about FORM 208 at once.

208
WITH TUBULAR TERMINALS

Copyright 1953 The Chase-Shawmut Co.

OUR 60 IN YEAR — FROM EDISON TO ELECTRONICS

208 AMP-TRAP — "Awake At The Switch"

THE CHASE-SHAWMUT CO.

370 MERRIMAC STREET • NEWBURYPORT, MASSACHUSETTS

comes in contact with this platen, a permanent heat seal is produced with a minimum of equipment and supervision required. System has proved to be almost 100% foolproof in producing the desired sealed seam. D. E. Dome, Commercial Sales Rep., Ohio Power Co., Newark, O.

Heating shot with electric strip heaters in shotblast pit at the Denison Engineering Co, Columbus, Ohio has eliminated frequent shutdowns and a messy job. Formerly, natural moisture in air system had a tendency to make shot cling together. Strip heaters are clamped to walls of pit to keep shot inside dry and free from caking.

Converting waste wood and edgings into shavings for cattle bedding with a "Blow Hog" at S. J. Bailey & Sons Co, Luzerne, Pa has eliminated the accumulation of waste wood at the rear of the plant where it was a nuisance and fire hazard. Since all wood used in furniture manufacture is kiln dried there is an excellent market for the shavings which is ideal for cattle bedding, particularly on concrete floors. It is expected that machine will pay for itself within one year out of profits realized from sale of waste shavings. Demand of this blow hog is 19-kw. Charles Miller, Industrial Representative, Luzerne Division, Pennsylvania Power & Light Co.

Supplementary heat from 3-1500-w strip heaters in a gas-fired drying tunnel at Aircraft Marine Products, Inc Elizabethtown, Pa helps provide uniform temperature control and has reduced rejects by 40%. Gas-fired tunnel could not maintain an even heat until the supplementary electric heat was added. Clyde Oberholzer, Industrial Representative, Pennsylvania Power & Light Co, Lancaster.

Curing plastic coating on cloth for garden gloves at Edmont Mfg. Co., Coshocton, Ohio, by use of electric radiant heaters, has made possible continuous processing cycle, eliminating several costly and time consuming material handling steps. A bank of tubular radiant heaters mounted on coating machine produces uniform, durable plastic coating with improved product quality. Saving in floor space and improved working conditions in area are also realized. Doran A. Sauers, Jr., Industrial Power Eng., Ohio Power Co, Coshocton, Ohio.

Victor No. 9 Pintypes undergoing routine electrical flashover, visual inspection, and final check for pinhole thread accuracy.

VICTOR PINTYPE INSULATORS

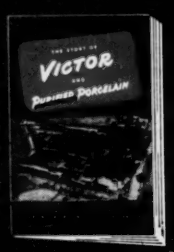
Must Pass These Tests!

1. **ROUTINE ELECTRICAL FLASHOVER**
   Every Victor pintype undergoes a routine electrical flashover test before shipment to insure trouble-free service.
2. **ACCURATE PINHOLE GAGING**
   Every lot of Victor Pintypes must be able to pass the standard NEMA test for pinhole thread accuracy.
3. **CAREFUL VISUAL INSPECTION**
   The finished insulator is thoroughly inspected for general appearance with special attention to smoothness of conductor and tie-wire grooves.

These tests assure almost unheard-of uniformity of service . . . unequalled ease of installation of pintypes. These features, coupled with the greater hardness, strength and resistance to impact of Victor *Purified Porcelain*, make Victor Pintypes the power man's best buy.

VICTOR NO. 9
LOW VOLTAGE
PINTYPE

FREE BOOKLET gives you the full story on how Victor Insulators are made—how and why *Purified Porcelain* was developed. Write us for your copy.



Specify VICTOR INSULATORS!

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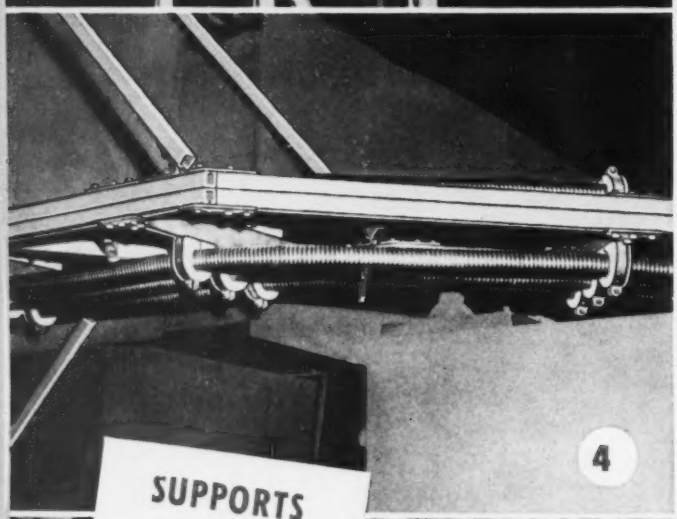
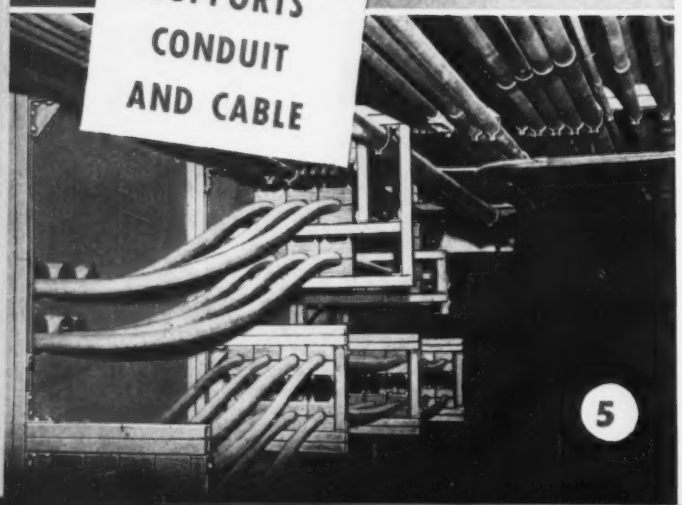
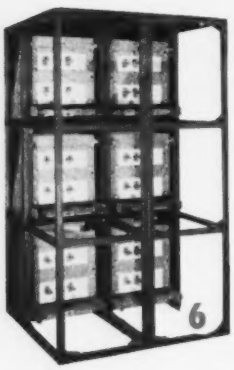




USE ADJUSTABLE UNISTRUT® METAL FRAMING TO MOUNT, FRAME, SUSPEND, SUPPORT ALL YOUR ELECTRICAL EQUIPMENT

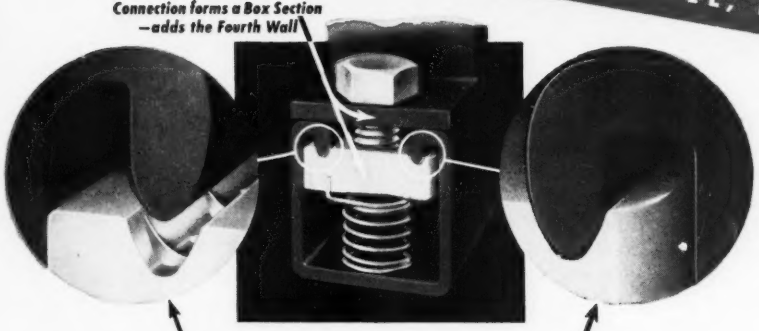
quickly, easily, at low cost—
right on the job!



- **No welding, drilling, or punching**
- **Fast on-the-job assembly**
- **Reduces engineering detailing**
- **Eliminates errors**
- **Last minute changes easily made**
- **No waste—UNISTRUT is re-usable**

1. Showing portion of processing plant's motor control rooms with all control equipment supported by UNISTRUT channel, maple cable clamps and fittings.
2. UNISTRUT-supported fluorescent fixtures in machine shop. System provides perfect fixture alignment, added safety and better appearance.
3. UNISTRUT-supported heavy conduit run in large processing plant. UNISTRUT's extreme flexibility permits later additions or changes.
4. Bracing arrangement utilizes standard UNISTRUT channel and fittings in attaching the cable-supporting UNISTRUT framework to wall. Note porcelain insulating clamps.
5. UNISTRUT framing, porcelain and maple insulating cable clamps support cable and conduit.
6. Section of a draw-out switch cubicle completely framed with UNISTRUT channel and fittings.

This is UNISTRUT
the complete framing system



Hardened Nut has Corrugated Grooves which bite into Inturned Edges for Positive Clamping Action

Inturned Edges can't Buckle or Spread. Nut-to-Channel Locking Action holds Side Walls in Original Position

This Pyramid Shaped Edge has ⅓ more Bearing Surface than ordinary Flat-Edged Channel and Flat-Surfaced Nut

ONLY THE UNISTRUT FRAMING SYSTEM HAS THIS POSITIVE CLAMPING ACTION AT ALL POINTS OF CONNECTION!

Distributors and Warehouse Stocks in Principal Cities. Consult your Telephone Directories.

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For the Man on the Job—packed with photos, drawings, ideas and data on how to frame, mount, rack and support electrical and mechanical equipment with UNISTRUT metal framing.

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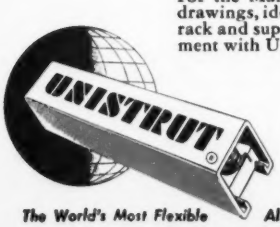
U. S. Patent Numbers
2327587 2329815 2345650
2363382 2380379 2405631
2541908 Other Patents Pending

See our complete Catalog in Sweet's 1953 Plant Engineering, Industrial Construction, and Architectural Files.



The World's Most Flexible All-Purpose Metal Framing

UNISTRUT PRODUCTS COMPANY
1013 W. Washington Blvd., Chicago 7, Ill., Dept W8

Please send me a copy of the new Catalog 800, without obligation.

Name_____

Company_____

Address_____

City_____ Zone_____ State_____

KENNETH KINSEY, division manager, receives Kingfisher award from R. J. Monroe, general merchandise manager, for his part in . . .

Selling Appliances on the Point System

Iowa Electric Light & Power Co's incentive plan practically doubles sales during first half of year

Iowa Electric Light & Power Co is carrying out a comprehensive load building campaign, which during the first half year has seen its appliance sales almost doubled over the same period in 1952. The promotion includes: a range rental plan; subsidies for range and water heater installations; cash prizes for division commercial managers; all-expense vacation trip to Canada for winning division managers and outside salesmen; and cash bonuses for employee participation.

Through May 31, the utility had sold or rented 823 electric appliances 427 of them ranges and 255 water heaters—compared to a total figure of 484 for the first five months of last year.

Year-Long Contest . . . The division commercial manager's contest runs through the year and winners will be determined by bonus points. Monthly quotas have been set up for each division for each month.

The three divisions making the highest percentage of their monthly quotas earn points on the following basis: First, 150 points; Second, 75 points; and Third, 50 points.

They will earn additional bonus points as follows, for each appliance sold or rented in excess of assigned monthly quotas:

Electric Appliance	*Points*
Range (new or used)	10
Water heater (new or used)	10
Clothes dryer (new)	10
Freezer (new)	10
Automatic washer (new)	5
Refrigerator (new)	3
Commercial cooking equipment (new)	20

The three monthly winners are also awarded 10 points for each combination sale of two or more leader appliances: ranges, water heaters, clothes dryers, and freezers. Five additional points are awarded for sale or rental of a leader appliance in towns, classified Class 2, where kilowatt-hour sales have been below the company's average.

Each division having five or more turnovers in inventory during the year will receive 300 points. Turnover is determined by dividing the gross annual sales by the average monthly inventory.

The company also recognizes the need for merchandise profits. Leadership in this objective is figured on percentage of gross profit to sales on all merchandise sold. Monthly points for this are: 100 for highest percentage of profits; 50 for second; and 25 for third.

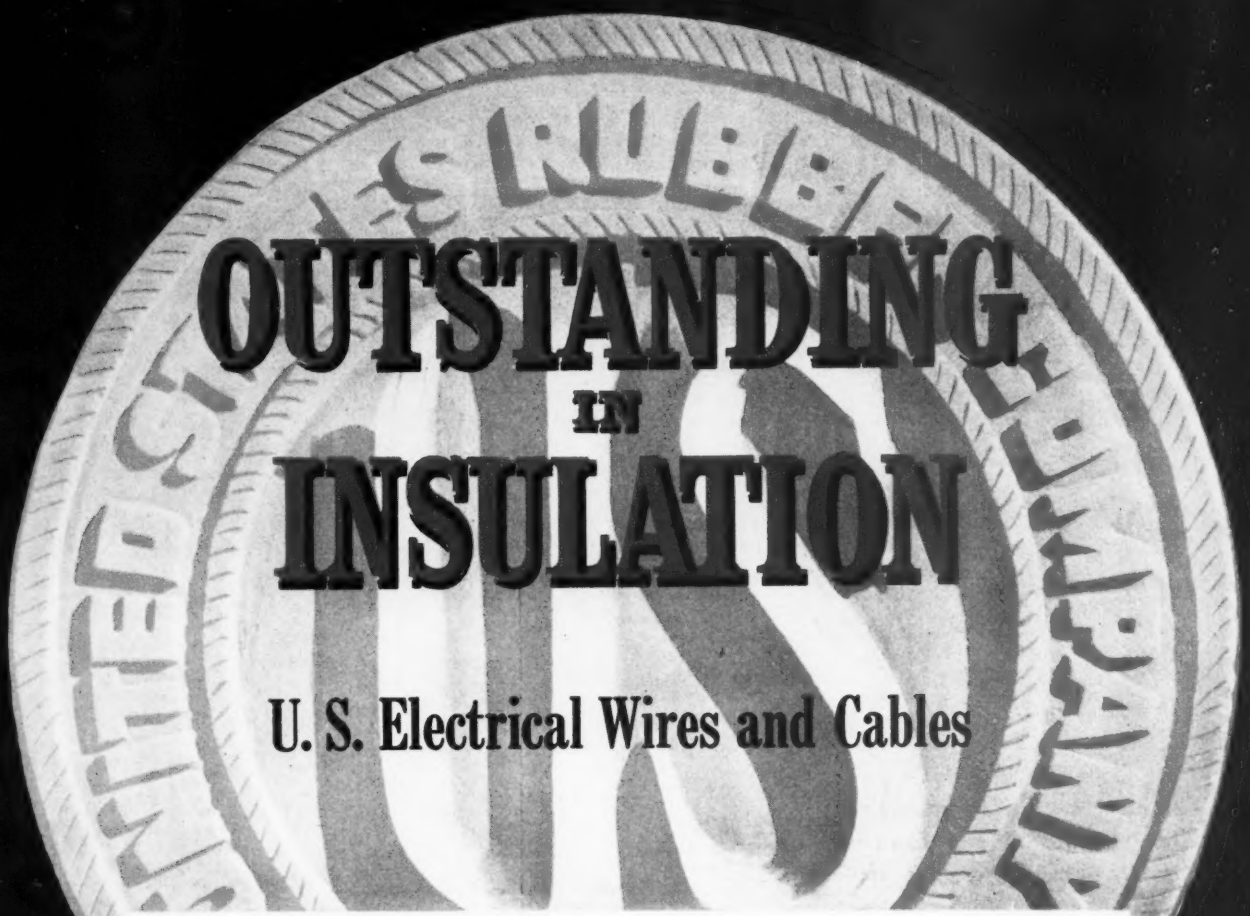
Total points in all objectives determine the division standings for a particular month.

Range Rental Plan . . . To increase load in Class 2 towns, a special range rental plan is being followed. It provides for:

Results of drive, Jan. 1 to May 31

Electric appliance	No. sold and/or rented 1952	1953
Clothes dryers	83	98
Freezers	47	73
Ranges	176	427
Water heaters	178	225
Total	484	823

UNITED STATES RUBBER COMPANY



OUTSTANDING IN INSULATION

U. S. Electrical Wires and Cables

LAYTEX® RUH-RUW—The world's smallest diameter, lightest weight natural rubber-covered power and lighting wire.

NEOLAY® RU—With Laytex Insulation plus Neoprene. Nylon cover makes pulling five times easier.

CONTROL CABLE—Insulated with Laytex for greater circuit integrity.

NEOPRENE COVERED SERVICE ENTRANCE CABLE—Flame retardant, moisture resistant—the first ever accepted by Underwriters' Laboratories, Inc.

MUNICIPAL SIGNAL CABLES—Insulated with Laytex for maximum moisture resistance.

POWER CABLES—Of every description, including the famous Grizzly® line of tough cables.

ALUMINUM WIRES AND CABLES—U. S. Rubber introduced insulated aluminum conductors.

ELECTRIX® PLUGS—U. S. Rubber was a pioneer in the development of soft rubber plugs for extension cord sets and power supply cords. (Also all rubber cube taps.)

ROYAL PORTABLE CORDS AND CABLES—And many other types of electrical wires and cables.

ROYAL MINING MACHINE & LOCOMOTIVE CABLES—Tested many different ways to insure complete dependability.

INTERCOMMUNICATION CABLE—With thermoplastic insulation and jacket making this cable flameproof throughout.

TWISTED SERVICE DROP CABLE—Either neoprene insulated or performance insulation and neoprene jacket; copper or aluminum conductors.

UNITED STATES RUBBER COMPANY · ELECTRICAL WIRE & CABLE DEPARTMENT

1230 Avenue of the Americas · Rockefeller Center, New York 20, N. Y.

The Old Reliable

EVERSTICK ANCHORS...

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

They speed up work and provide dependable anchorage in new construction and maintenance. Quick and easy to install—made of tough rust-resistant malleable iron—their holding power "tops" all others. Available two-way, three-way, four-way, and cone types. Write for facts.

AN EXCLUSIVE
EVERSTICK
FEATURE
Exclusive Everstick nut housing. Locks anchor firmly on rod. No chance of rod slipping thru anchor.

EVERSTICK ANCHOR CO.
Manufacturer of "THE ANCHOR OF MERIT"
FAIRFIELD, IOWA

- Rental of $2 per month payable with the electric bill.
- Installation subsidy of up to 50%.
- Free repair service during rental period.
- Monthly rentals to be applied on purchase price at any time.
- Customer agreement to use range for at least one year.
- Outside salesmen being paid a commission of $5 for each range placed on rental basis, and regular commission if customer purchases range.

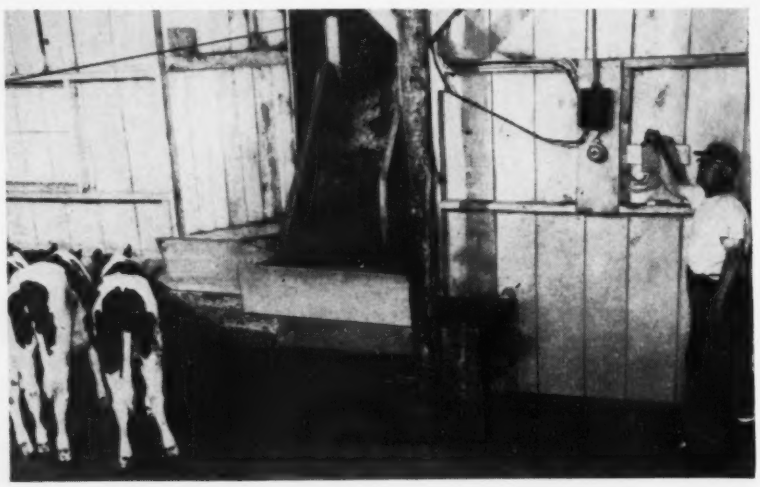
Employees who turn in the name of a customer interested in a leader appliance, leading to a sale or rental, receive a cash award, while public contact employees are offered sales training through movies and record films on the how and why of selling. Employees are also invited to division sales conferences, as are dealers and their sales people.

Free Vacation . . . Winners in a division managers' contest and top sales people were given an all-expense vacation trip for their efforts through June 30. Quotas were set for each division. In order for a division manager to qualify his division had to make or exceed the quota on at least four of the six appliances promoted, and at least 50% of the quota for the other two.

The 10 salesmen selling the largest number of these appliances also qualified for the fishing excursion.

High man for the contest, Kenneth Kinsey, of Nevada, Iowa, won the title of King Fisher for the trip. The two low men who qualified were assigned as his orderlies during the trip. They baited his hook, shined his shoes, lighted his cigarettes, mixed his drinks, and, generally, rendered any service he requested. Anyone failing to address him by his temporary title had to pay a dime.

Free Electricity . . . As for the customers, they received free electricity coupon books for purchasing a range or water heater from a dealer in the company's territory during March and April. This was a dealer coopera-



Feeding Cows by the Belt System

It just requires the energy to push two buttons for farmer David Chernoff to feed his 65 milking cows their silage cafeteria-style on a conveyor belt. He performs this 20-minute operation twice a day. The "cowfeteria" uses a silo-unloader operating in conjunction with a 105-ft conveyor belt. When Chernoff pushes the first button, it starts the unloader which draws silage to the center of the silo. It is sucked down a tube, which drops its contents on the conveyor. A second button activates a magnetic starter controlling a reversible capacitor motor which furnishes drive for the belt. The belt stops automatically when the silage reaches the far end. The system, which has been in operation two winters, has saved Chernoff the wages of at least one hired hand. His monthly electric bill on the whole milk operation is $15.

The RIGHT DRAFT for Any Combustion Condition

...Stepless, Wide Range Speed Control of Direct Coupled Draft Fans

When Type 257 Liquid Rheostats control the speed of boiler fans driven by wound rotor motors you get:

- Immediate response to varying draft conditions.
- Smooth, continuous, *stepless* speed control.
- Equal sensitivity over the entire operating range.

HOW IT WORKS. Motor speed is varied by increasing and decreasing resistance. This is accomplished by raising and lowering electrodes and the level of current-carrying electrolyte. A pilot device transmits draft condition to a lifting mechanism which controls electrode position and electrolyte level. A full resistance range is provided in only 10 inches of electrode travel. The basic principle of liquid rheostat operation plus the utilization of specially engineered electrodes gives a linear relationship between motor speed and electrode travel over the complete rheostat range.

Since the rheostat is not mechanically connected to the motor it may be located to suit the most convenient plant layout. For complete details, contact your Allis-Chalmers representative or write for leaflet 14S7544. A-4066

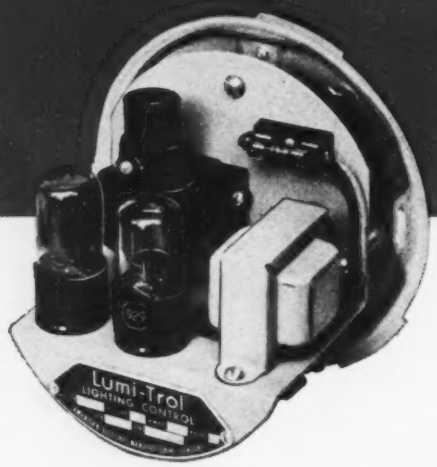
ALLIS-CHALMERS

Milwaukee 1, Wisconsin

Lumi-Trol

PHOTO-ELECTRIC

LIGHTING CONTROL



AT LAST . . . here is OUTSTANDING PERFORMANCE in a SIMPLIFIED . . . POSITIVE-ACTING control for street lighting.

It is precision made and ruggedly constructed for trouble-free operation.

This is a QUALITY one-tube and photo-cell unit employing a plunger-type mercury contactor which is HERMETICALLY SEALED with no external moving parts . . . for that extra dependability.

Controls mounted in standard meter base and cover.

1. MERCURY CONTACTOR. Single pole and double-pole mercury contactors rated 30 amperes at 115 volts, 20 amperes at 230 volts. Contacts sealed in pressurized, non-oxidizing, gaseous atmosphere. Requires no maintenance.
2. QUALITY. A simplified design utilizing only one-tube and a photo-cell enables the use of high quality components at moderate cost.
3. CONSERVATIVE DESIGN. Trouble-free operation is assured by underrated components utilized in a stable circuit.
4. RUGGED CONSTRUCTION. Heavy gauge metal chassis and base . . . all components easily accessible and rigidly mounted . . . clean design.
5. TIME DELAY. A delay circuit is provided to prevent passing lights and lightning from operating the control.
6. CONTROL LEVELS. Standard controls are factory adjusted to turn-on at one foot-candle. Adjustment is provided for individual requirements.
7. POWER REQUIREMENTS. This efficient circuit consumes less than 5-watts and operates one of the most efficient contactors in the field.
8. VOLTAGE REQUIREMENTS. This is a highly stable design and will function with supply voltages beyond the range of 105-130 volts, 50-60 cycles. Also beyond the range of 210-255 in the 230 volt control.

Please write for further information and prices.

AMERICAN ELECTRIC MFG. CO.

P. O. BOX 5142

MEMPHIS, TENNESSEE

tion activity. There were six coupons in a book, each worth $2.50. The coupons, when presented by the customer, were credited on his electric bill.

The books were given only when a range or water heater replaced another type of fuel. They were furnished to dealers after confirmation of sale and installation.

To qualify, a dealer had to run at least one newspaper ad on ranges and water heaters during March and April and had to maintain a separate and clean display. They were supplied with window streamers.

Commercial Cooking Drive . . . To promote sales of electric commercial cooking equipment, an installation subsidy of $6 per kw of connected load is paid to a purchaser on installation of new equipment purchased from the company or a dealer. Subsidies are limited to 25 kw connected load.

Under-Floor Brooders Give Mother-Hen-Warmth

Installation of electric under-floor brooders provide baby chicks with mother-hen-warmth without heating up the brooder house. This condition is demonstrated by Howard Strothers of Milmay, N. J.

From 3,500 to 4,000 chicks can be brooded in Strother's brooder house. Here are used 14 electric under-floor brooders giving approximately 280 sq ft of hover area. A 6 to 7-week brooding period consumes 0.5 to 1 kwhr per chick.

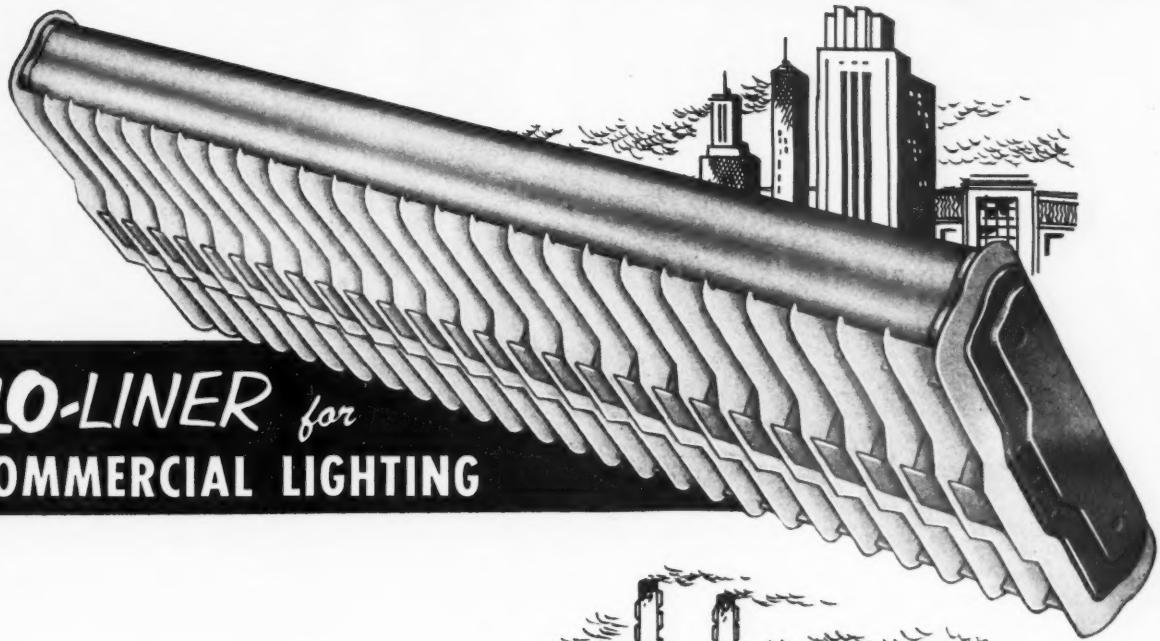
Each brooder is made up of 120 ft of soil heating cable formed in a circle and buried 1 in. in the cement. Each cable is a load of 840 watts and is connected to 220 v, 1-phase circuit with thermostatic control.

Would Pay to See TV

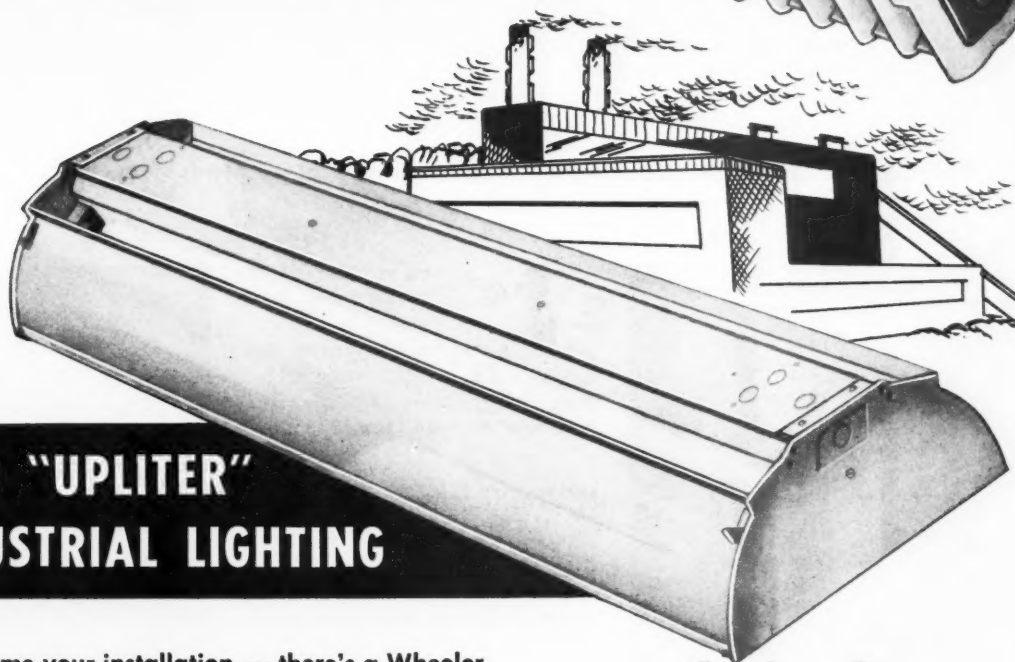
Sixty-five per cent of the people are willing to pay one dollar to see a championship fight on TV. At least that is what they told a Purdue University Opinion Panel in questionnaires sent out to determine the possibilities of "pay as you see" TV. In the first six days of returns more than 23,000 replies were received from 100,000 questionnaires sent out.

Whatever your Lighting Requirements...

THERE'S A *Wheeler* FIXTURE THAT'S RIGHT FOR YOU *and the* JOB!



FLO-LINER *for* **COMMERCIAL LIGHTING**



DAY-FLO "UPLITER" *for* **INDUSTRIAL LIGHTING**

Name your installation — there's a Wheeler Fluorescent Fixture to give you maximum lighting efficiency! For 72 years, Wheeler has adhered to the standard of manufacturing only quality lighting fixtures — engineered for ease of installation and proven maintenance savings.

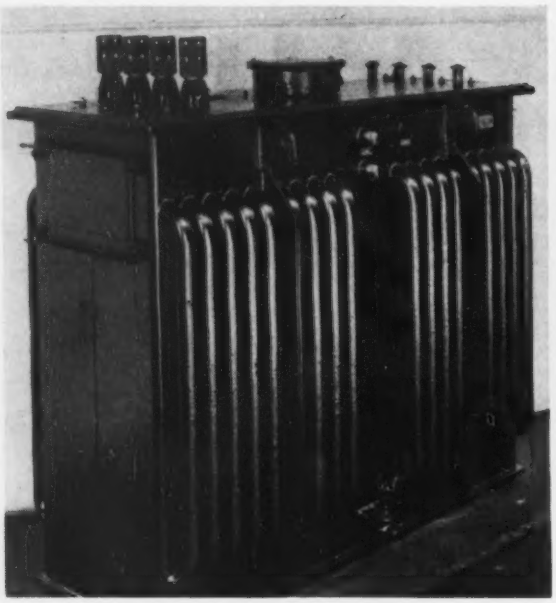
For full information on the above units and the complete Wheeler line of fixtures, write Wheeler Reflector Co., 275 Congress St., Boston 10, Mass.

Wheeler
REFLECTOR COMPANY
275 Congress St., Boston 10, Mass.

Distributed Exclusively through Electrical Wholesalers

REPRESENTATIVES IN PRINCIPAL CITIES

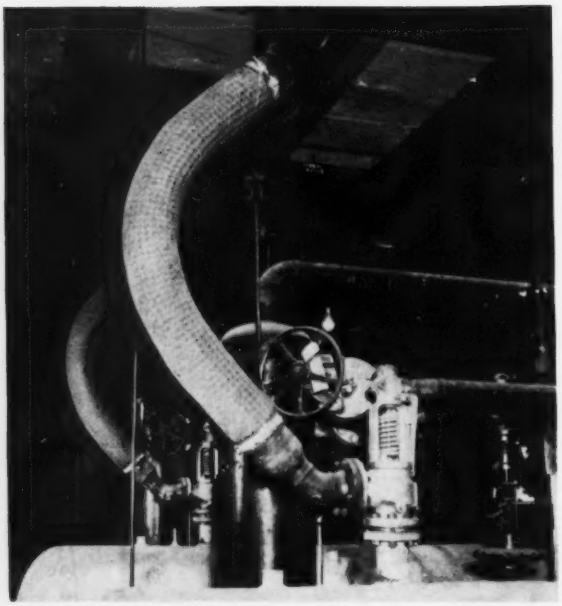
NEW EQUIPMENT



Pre-Assembled Transformer

New pre-assembled distribution transformer unit is known as the Power Pac Assembly. It consists of a single tank containing standard distribution transformer core-and-coil assemblies. Ratings for 3-phase are 150, 225, and 350 kva. Combination three phase/single phase ratings are 100 and 200 kva. Core-and-coil units are quickly and easily replaced for changing capacity, rating, or secondary voltage.

Pennsylvania Transformer Company, Canonsburg, Pa.



Metal Hose

The corrugated, flexible metal hose assembly is claimed to eliminate the extreme noise and possible resultant injury to workers caused by unexpected discharging of safety valves. In addition, better relations with plant neighbors results because of reduced outside noise.

Flexible assembly is attached to safety valve and extends to exhaust pipe. When valve releases, sealed unit is said to absorb sound, heat, and vibration.

Flexonics Corp, Maywood, Ill.

Rectifiers

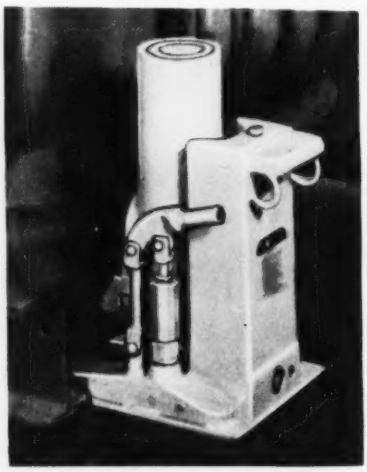
A line of selenium-plate rectifiers with claimed features including trouble-free operation, almost unlimited life, and no maintenance has been announced. Units are available for 3 kw to 50 kw, 125 or 230 v dc outputs. Either fixed or variable voltage units for any ac voltage or frequency input can be supplied.

American Rectifier Corp, New York

Hydraulic Jack

The Rol-Toe hydraulic jack is designed for lifting transformers, even when there is only 1¾-in. clearance between the floor and transformer base. Further, it is reportedly able to lift full capacity on either cap or toe. A roller bearing working with the toe takes the radial load.

Two separate pumps are provided on each jack. One, a high speed pump, can be used for positioning the jack and for lifting light loads. A higher pressure pump is used for heavy lifting. The jack is said to operate at any angle with no loss of fluid or efficiency, and is available in two capacities—10 and 25 tons.

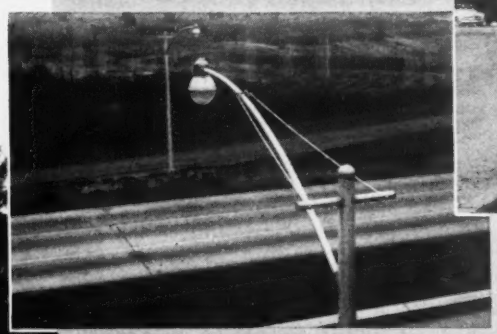


Templeton, Kenly & Co, Broadway, Ill.

Everywhere

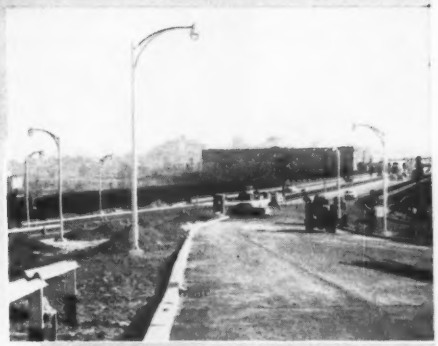
HAPCO ALUMINUM STANDARDS and STREET LIGHTING BRACKETS

One of many installations of HAPCO Lighting Standards near a Florida metropolis.



Special red signal blinker and safety light on a short HAPCO Standard.

Top view of HAPCO Arm with Tie-rods and back brace to eliminate side sway.



Installation of HAPCO Lighting Standards during parkway construction in New Jersey.

Twin Brackets and HAPCO Poles lighting both sides of divided four lane Pennsylvania Highway.

Traffic signals and parkway illumination combined on HAPCO Standards.

HUBBARD ALUMINUM PRODUCTS COMPANY

MANUFACTURERS OF HAPCO QUALITY ALUMINUM PRODUCTS

A Division of HUBBARD and COMPANY

6301 Butler Street • Pittsburgh 1, Pa.

UNIFORMITY...
never a surprise
when you use

BERMICO®
FIBRE CONDUIT

Uniform wall thickness
Uniform diameter of bore
Uniform impregnation
Uniform quality of fibre

Automatic forming and processing ... close controls over the drying process ... machining of taper and length ... four rigid factory inspections – these are the things that guarantee Bermico's uniformity of dimensions, specifications and quality.

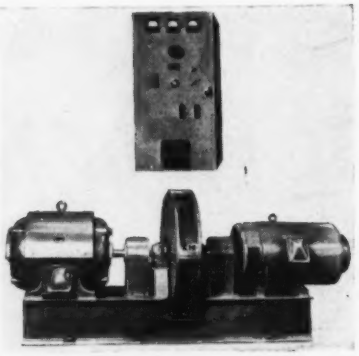
For surest cable protection, be sure to specify Bermico Fibre Conduit. Made by Brown Company from sturdy wood fibre, impregnated with pitch, it is–

• Light • Tight • Strong • Waterproof • Acid-Resistant • Smooth Inside and Out

distributed by
WESTINGHOUSE
Electric Supply Company. Offices in principal cities

BROWN QUALITY **COMPANY, Berlin, New Hampshire**
CORPORATION, La Tuque, Quebec

SOLKA & CELLATE PULPS • SOLKA-FLOC • NIBROC PAPERS • NIBROC TOWELS • NIBROC KOWTOWLS
NIBROC TOILET TISSUE • BERMICO SEWER PIPE, CONDUIT & CORES • ONCO INSOLES • CHEMICALS



Motor Generator

A new flywheel motor-generator set and associated emergency transfer controls has been designed to insure service continuity for microwave systems. During normal operations, the set, supplied from commercial power, supplies communication equipment. If there is a power system disturbance energy stored in the flywheel drives the generator with a frequency tolerance down to 50 cycles for a 7-sec interval.

Transfer control has a frequency relay sensitive to 1½ to 2-cycle decline that starts standby power supply. When standby power voltage and frequency is normal a throw-over switch connects the microwave equipment to it. Microwave system is transferred back to motor generator when commercial power is restored.
Electric Machinery Mfg Co, Minneapolis 13, Minn.

Galvanometer

For measuring low values of current or voltage, the portable galvanometers are said to feature high sensitivity. This is attributed to alnico magnets that have a field strength of more than twice that for chrome-steel magnets heretofore used. Other features include:

(*Continued on page* 168)

The **WHO...**

WHAT...

WHY...

WHEN...

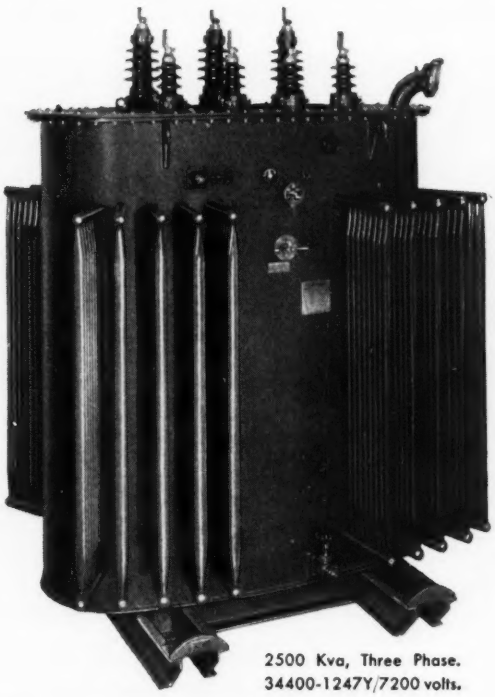
and **WHERE**

on how you can

Save up to 8%

by specifying

PENNSYLVANIA STANDARD PARTS POWER TRANSFORMERS



2500 Kva, Three Phase.
34400-1247Y/7200 volts.

who Can Use Pennsylvania Standard Parts Power Transformers?

Practically all utilities and industrials can use Pennsylvania Standard Parts Power Transformers because the electrical ratings and accessories are in accordance with NEMA Standards and proposed ASA-Standards C57.12a. To meet a wider range of system requirements, variations are permitted both in accessories and in electrical characteristics.

what Are Pennsylvania Standard Parts Power Transformers?

They are single or three phase Power Transformers, now manufactured in sizes up to 10,000 Kva and up to 69 Kv. Transformers are "Standard" when they conform to standard voltage ratings and are equipped with standard accessories in standard locations. For such transformers a full discount of up to 8% is applied. When voltages are other than standard, but within a certain voltage rating, slightly lower discounts are applied.

why Do Standard Parts Power Transformers Sell for Less?

Because quantity production methods of manufacturing, coupled with the use of standard designs and standard parts, shorten engineering and production time which, in turn, reduces the price of the transformer by as much as 8%.

when Can Deliveries Be Made on Standard Parts Power Transformers?

As a rule, deliveries of Standard Parts Power Transformers will be at least six to eight weeks faster than deliveries of special transformers. In some sizes, however, deliveries may be made even sooner.

where Can More Information on Standard Parts Power Transformers Be Obtained?

By contacting the Pennsylvania Transformer Representative in your area or by writing to Pennsylvania Transformer Company, Box 330, Canonsburg, Pa.

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division

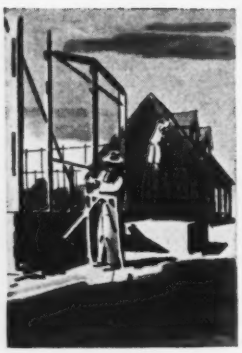
CANONSBURG · PA.

For every Electrical need

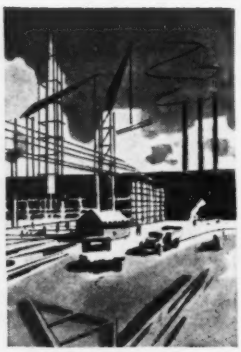
CHECK General for ELECTRICAL

AUTOMOTIVE - AIRCRAFT

COMMUNICATIONS

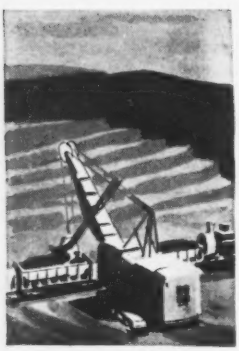


CONSTRUCTION



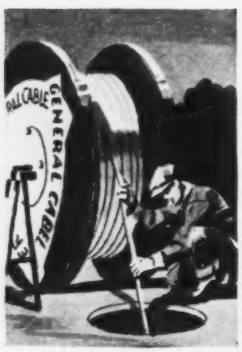
GENERAL INDUSTRY

MFRS. ELECTRICAL APPARATUS



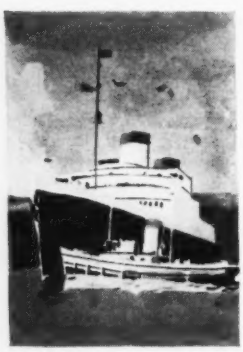
MINING-EARTH MOVING

MUNICIPAL



POWER

RAILROADS



SHIPBUILDING - SHIPYARDS

GENERAL CABLE
CORPORATION

"More Power to You"®

Executive Offices: 420 Lexington Avenue, New York 17, N. Y.
Sales Offices in Principal Cities of the United States

Cable FIRST
WIRE and CABLE

Copper, bronze and aluminum conductors in thousands of different sizes and types of product. Constructions and insulations of every modern variety.

This is General Cable, a *prime source of supply* for everyone who generates electricity, distributes electricity or utilizes electricity.

Whatever your electrical wire and cable need, whenever you need it—say "General Cable" to your purchasing agent, your distributor—or call on the nearest General Cable office.

ONE Source of Complete Supply

ONE Completeness of Service

ONE Standard of Quality

For Quicker Service Anywhere in the United States...General Cable maintains

22 Sales Offices

14 Resident Sales Representative Locations

Over **600** Distributor Sales Locations

6 Regional Stock Distribution Points

6 Manufacturing Plants and Stocks

the latest unit in a proven line of...

PHOTOELECTRIC CONTROLS for street lighting

The new improved F-P Control 63300C is the result of eight years of practical experience in photoelectric control for street lighting. Developed in conjunction with leading utility engineers, the new unit provides:

ACCESSIBILITY — The potentiometer is easily adjusted and the circuit fuse quickly changed without removing the meter glass. All major components are readily accessible.

SWITCHING CAPACITY — A SPDT double break power contactor is built into the control chassis. The normally closed contacts energize a lighting load at night up to 3000 watts. The normally open contacts energize a load during daytime up to 2000 watts. These ratings apply to incandescent, mercury or sodium vapor lamps.

PROTECTION — The F-P Series 63300C Control is conservatively rated 3000 volts RMS hipot between any part of the circuit and ground. In the event of functional failure of the circuit, the controlled lighting load will remain on.

HIGHEST QUALITY components are used throughout. All tubes are preaged and tested to give a nominal life of over 20,000 burning hours. All other components have much longer life. Fisher-Pierce Photoelectric Controls have been proven reliable by the experience of hundreds of utilities in thousands of installations.

METAL ENCASED CONDENSERS
CIRCUIT FUSE Easily checked
PHENOLIC SUBMOUNTING CHASSIS Maximum component protection
NEW PILOT RELAY Balanced armature construction
NEW POWER CONTACTOR Night load energized on normally closed contact.
POTENTIOMETER Readily accessible
CLEAN METER PLATE Nothing to interfere with external wiring

Write for Catalog.

The FISHER-PIERCE CO., Inc.

82 Pearl St., So. Braintree, Boston 85, Mass.

EXPORT: PHILIPS EXPORT CORP. 100 E. 42nd STREET NEW YORK 17, N.Y.

IN CANADA: NORTHERN ELECTRIC CO., Ltd.

Galvanometer

(*Continued from page* 164)

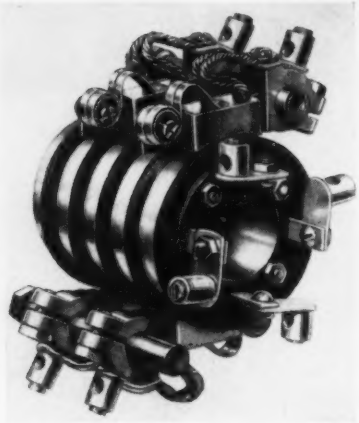
1. Removable coil and suspension element that can be replaced by systems of different sensitivity.

2. Shock mounted metal case, measuring 6½ x 8 x 16 in.

3. Translucent scale with 15-deg tilt and marked for 50-0-50 and 0-100 in 1-mm divisions.

4. And long beam path systems of mirrors mounted inside case.

General Electric Co, Schenectady 5.



Collector Rings

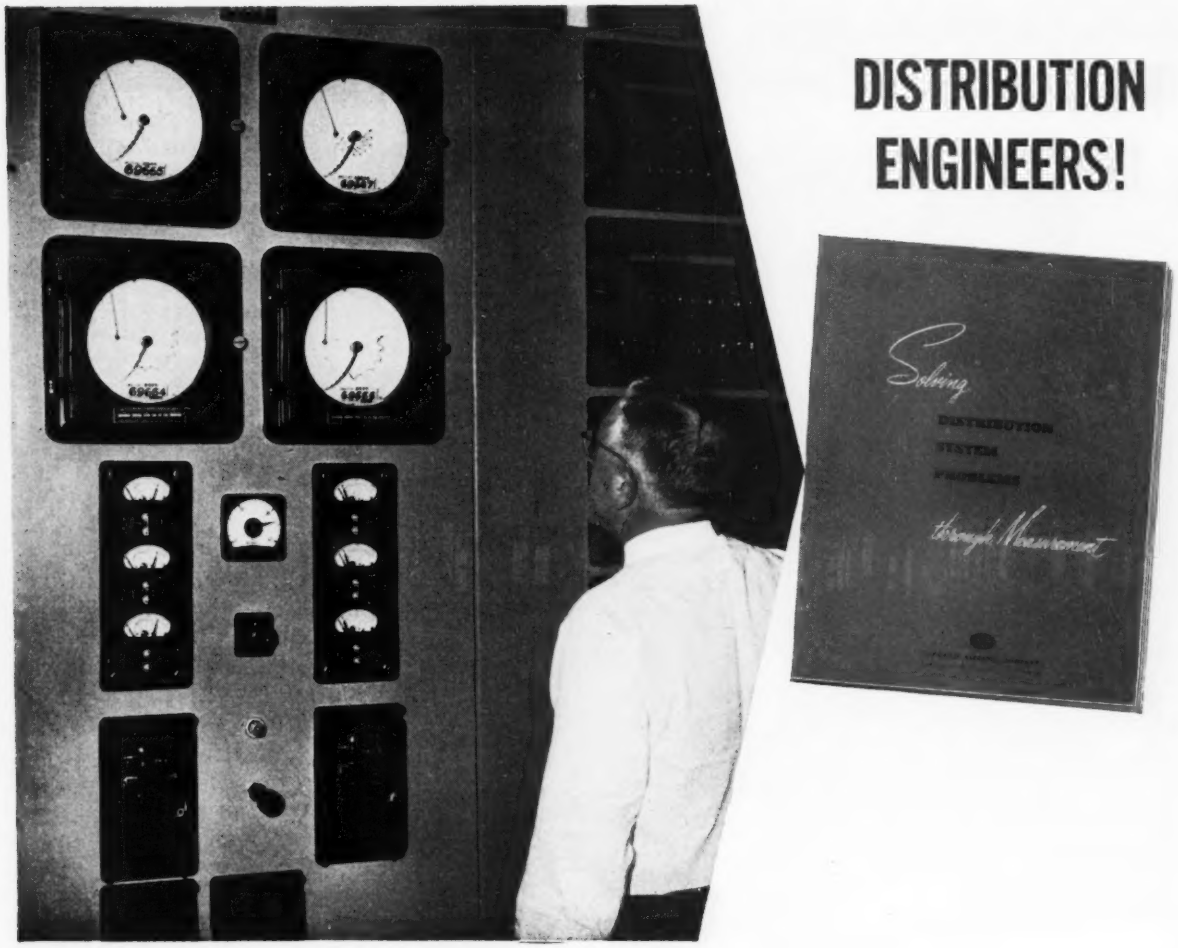
A new line of all-purpose collector rings has been developed for equipment having rotating parts requiring continuous current transmission. Sizes range from 1 to 16 conductors, ratings from 35 to 75 amp at 600 v, and applicable speeds up to 900 rpm. Bore of the standard model is 1½ in.

Insulators are made of moisture-proof phenolic material of high dielectric strength. Brushes are high-grade, high conductive copper graphite, with each brush shunted.

Industrial Electrical Works, Omaha, Nebr.

Water Gage

Long life and accurate water level readings in high pressure service are advantages claimed for this water gage. On gages for wide range of visibility, flexibility is gained by using two independent inserts and by interconnecting expansion loops. Gages for medium ranges use one insert and a single loop.



Take the guesswork out of your system operation

"Should we apply corrective measures now, or wait until trouble develops on this circuit?"

You can't afford to use guesswork methods to answer questions like this. Under today's rate of load growth you have the doubly difficult job of giving better service while loading closer to capacity with only a small safety factor.

You need accurate knowledge of load conditions to render good service and still get the best return on your system investment. Such knowledge can be obtained only through *measurement*.

Sangamo's booklet "Solving Distribution System Problems Through Measurement" tells how a number of utilities are solving this problem with permanent installations of Sangamo Thermal Meters. It tells about periodic surveys, too. Just clip the coupon below for *your* copy.

Only Measured Facts are Known Facts

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

SM53-4

SANGAMO ELECTRIC COMPANY, SPRINGFIELD, ILLINOIS

Send my copy of "Solving Distribution System Problems Through Measurement"

YOUR NAME_____

TITLE_____

COMPANY_____

CITY and ZONE_____ STATE_____

Another new development using

B. F. Goodrich Chemical *raw materials*

Brushed-on plastic coating stops motor parts corrosion

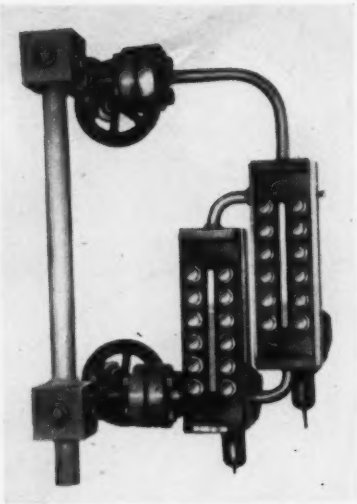
Dolflex coating made by John C. Dolph Co., Monmouth Junction, N. J. B. F. Goodrich Chemical Co. supplies the Geon resin only.

MOTOR repairmen find this new plastic coating a better-than-ever help to protect electrical motor components against corrosion. Made from a Geon vinyl resin, it does a better job than varnish-filled putty or other coatings. And it can be applied by brushing, coating or spraying—using a minimum amount of equipment.

The manufacturer found in Geon every quality needed to assure a completely protective coating. After fusing, the coating is extremely tough. It will not burn or support combustion. It resists acids, alkalies, caustics, oil and moisture. It has good heat conductivity—will not trap heat—and will not soften in the range of 250° to 325° F.

What Geon does for this plastic coating may start you thinking of how Geon materials can help you develop or improve more saleable products. For Geon materials resist heat and cold, water, weather, abrasion and most chemicals. We'll help with technical information. Please write Dept. GJ-8, B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

GEON RESINS • GOOD-RITE PLASTICIZERS...the ideal team to make products easier, better and more saleable
GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON colors



Flange connections eliminate stuffing boxes. Short lower flanged connection eliminates the cold water leg and results in added accuracy. Tie-bar-type water column linking gage valves provides circulation to keep gage nearer drum temperature.

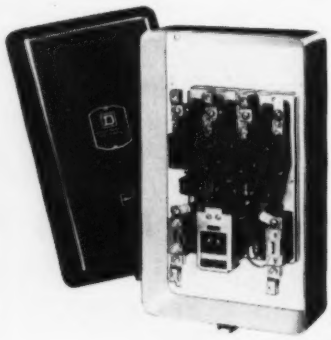
Yarnall-Waring Co, Philadelphia 18, Pa.

Starter

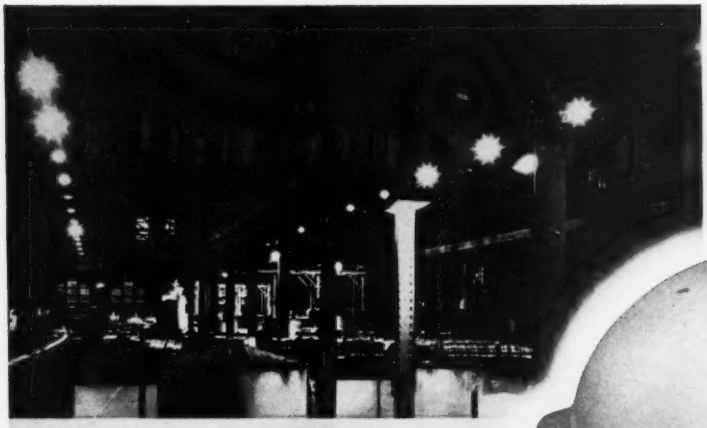
A vertical action starter of NEMA Size 4 has been announced. Its maximum polyphase rating is 50 hp at 220 v. 100 hp at 440 and 550 v, and measures 9¼ x 14¾ ⅝ in. Silver contacts double break to eliminate flexible jumpers and pivots. The armature has straight line motion and is guided at top and bottom.

Parts are front mounted for maximum accessibility. Contacts may be inspected by removing the arc chamber covers. Eight electrical interlocks (4 normally open and 4 normally closed) may be added to the starter. These are mounted on their own insulating bases.

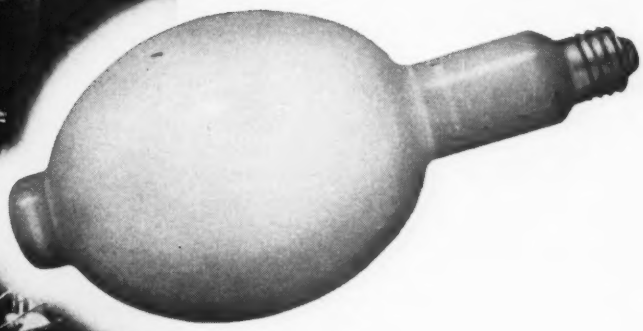
Square D Co, Milwaukee 12, Wis.



32 Westinghouse Mercury Type Lamps replace 44 Incandescents —Give 7 Times More Light



BEFORE changing to the Mercury type lamps, John A. Roebling's Sons Corp. used 44 incandescent lamps to light their annealing plant.



AFTER changing to Westinghouse Fluorescent Mercury Lamps—the new design that gives white light—John A. Roebling's Sons needed only 32 lamps to light the same area. These 32 lamps gave 7 times as much light as the Incandescents.

When lighting factories, terminal buildings, parking lots, railroad yards and highways . . . Westinghouse Mercury type lamps are more efficient and economical. They produce more light per watt than Incandescents, and have a rated average life of 5000 to 6000 hours. As a result, you reduce total lighting costs. Since you use fewer, longer-lasting Mercury lamps your maintenance costs are cut to the bone.

WHERE YOU WANT WHITE LIGHT, you can use Westinghouse Fluorescent Mercury lamps. They produce white light with regular Mercury lamp economy and eliminate color-correcting Incandescents. *The newest size Westinghouse 1000-watt Fluorescent Mercury lamp is the cheapest source of mass white light in the world.*

The facts are in a 24-page booklet that is yours, free for the asking. Write to: Westinghouse Lamp Division, Dpt. EW-8, Bloomfield, New Jersey.

YOU CAN BE SURE...IF IT'S Westinghouse

GAI-TRONICS POWER PLANT COMMUNICATION SYSTEMS . . .

Prove that ENGINEERING and EXPERIENCE make the BIG difference!

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DESIGN AND ENGINEERING

FABRICATION

OPERATION

The *completely engineered* GAI-Tronics power plant communications system is designed and built by men associated with the design, construction, and operation of power plants throughout the world. Their "know-how" insures the solution to your power plant communication problems.

Two-way or group conversations can be carried on over telephone-type handsets and sound projectors *without* using special booths. The projectors can be used for paging and issuing emergency instructions. If you desire, telephone-like privacy may be had with the flick of a switch even though the system remains alerted for emergency use. The completely engineered GAI-Tronics system can be installed by *your* maintenance men. With a GAI-Tronics system, your power plant is equipped with a custom-designed, internal communication system that is easy to install; easy to operate; easy to maintain. A GAI-Tronics power plant communication specialist will be glad to discuss your communication problems.

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READING, PA.

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FREE!

A booklet—Power Plant Communication Systems—or a convincing demonstration in your plant. The portable GAI-Tronics system designed by our engineers for this specific purpose can be scheduled for your plant upon request without obligation. Write today. Dept. G-T.

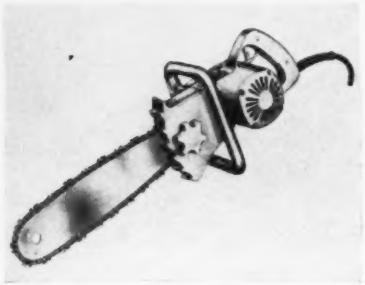
Volt-Amp Meter

Amprobe Junior is a snap-around ammeter. In addition, it can be used as a voltmeter by connecting voltage

test leads. An accuracy for both amperage and voltage is ± 3% of full scale on the 1.8-in. scale.

Four models, all rated at 0 to 125/250 v, are available: Model 10 measures 0 to 10 amp; model 25, 0 to 25 amp; model 50, 0 to 50 amp; and model 100, 0 to 100 amp.

Pyramid Instrument Corp, Lynbrook, N. Y.

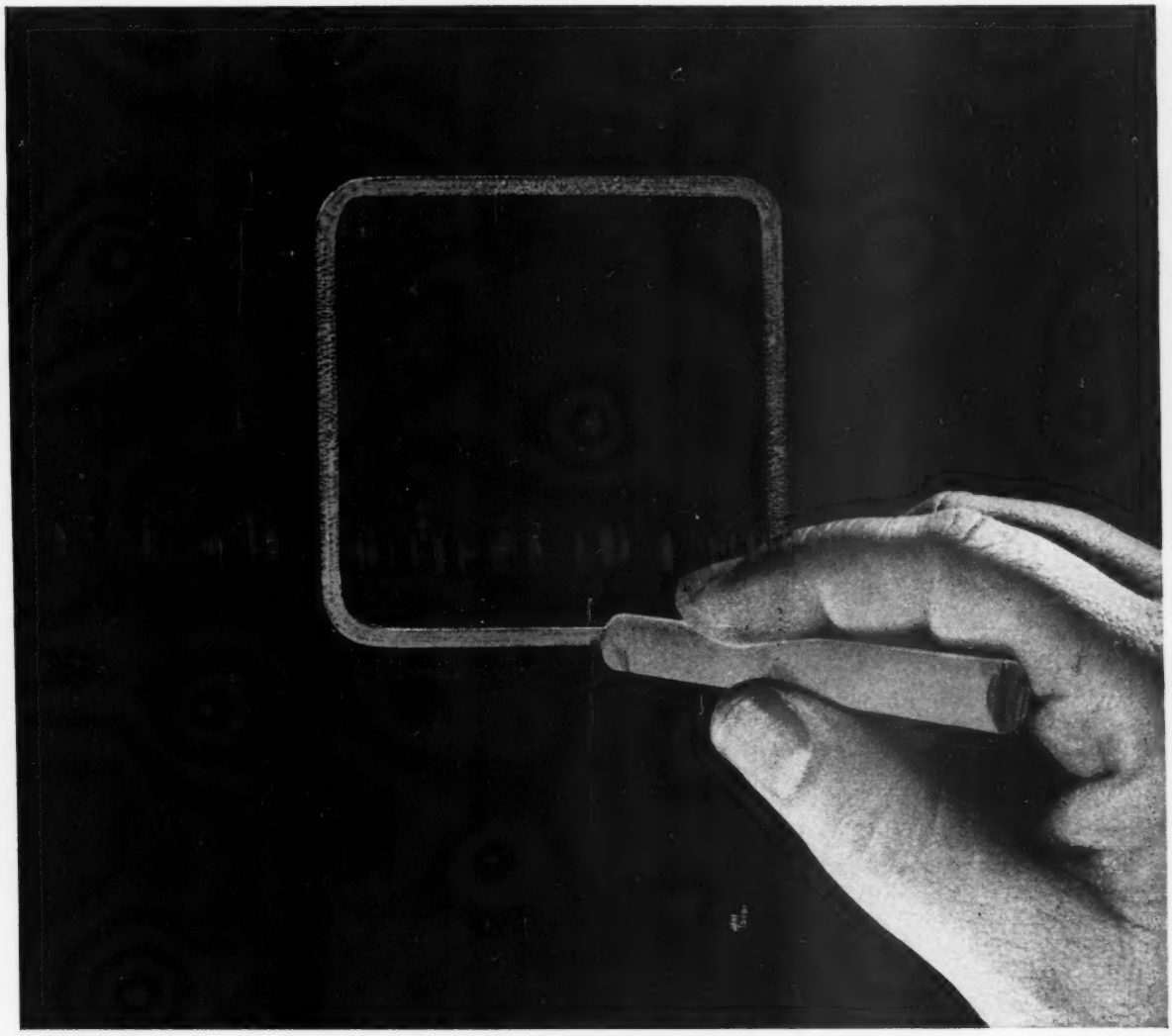


Electric Chain Saw

Model 125 is designed for heavy lumber and timber cutting up to 14 in. on one cut. Chain is chrome plated, chipper-type, and travels at 1,400 fpm. Weighing 16½ lb, the saw operates from 115 v and requires a 1,500-w supply. Units for 220 v are also available. Operation by one man is intended, with others in crew to control direction of falls.

Skil Corp, Chicago 30, Ill.

(*Continued on page* 176)



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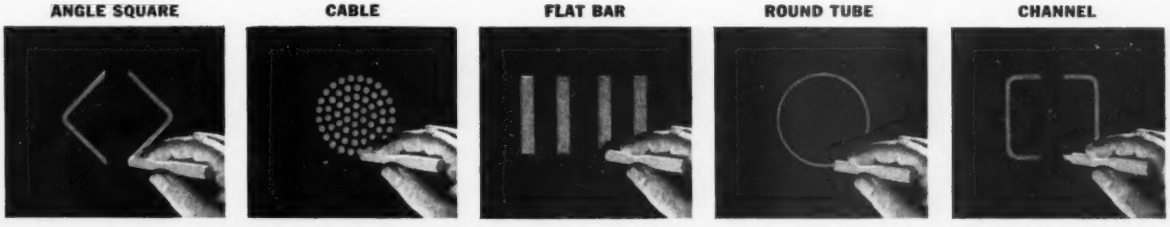
BUS CONDUCTORS

Where a square bus conductor of maximum rigidity is required, the square tube provides this physical property to a greater degree than either the channel or the angle square hollow types. Available in both ventilated and unventilated types, the square tube bus nevertheless lacks the high degree of ventilation and, therefore, the current-carrying capacity of the channel and angle square hollow types.

There is a complete line of ANACONDA Copper Bus Conductor designs for every type of installation and power requirement. Write today for your copy of "ANACONDA Copper Bus Conductors" containing illustrations and detailed technical information concerning designs and arrangements for bus conductors. The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

53131

carry the load with ANACONDA® Bus Conductors



GOOD NEWS FOR
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NOW JEFFERSON
BRINGS YOU A
CONSTANT WATTAGE
SERIES BALLAST
WITH
5 Star Performance
JEFFERSON
ELECTRIC

RAPID START

LAMP USERS!

Constant Light Output

Jefferson's new ballast combines the outstanding advantages of constant wattage with the money-saving features of the series rapid start circuit. This gives you positive and quick starts, ideal lamp operation, and constant light output—despite line voltage variations of as much as 20%.

100% Lumen Output

Superiority of design makes sure that you get an average of 100% lumen output — even with the normal voltage variations encountered. This means greater customer satisfaction.

Cool Operating

Great efficiency and low watt loss assures you of a unit that meets *all* current specifications regarding this type unit. This is attested to by the Electrical Testing Laboratories' Certification.

Completely Safe

With the Jefferson ballast a series circuit is safely *isolated*. This eliminates shock hazard and permits safe lamp replacement when the current is on.

Easier Wiring

Rapid Start lamps fit conventional bi-pin holders. There are no starters to wire. And, the new Jefferson unit fits standard rapid start fixtures — no new fixture tooling to worry about.

Jefferson 254-621 ballast is listed by Underwriters' Laboratories.

JEFFERSON ELECTRIC COMPANY
BELLWOOD, ILLINOIS

Catalog No. 254-621
Write For Bulletin 532-11

Jefferson Ballasts

Locate line faults instantly at ranges 1/2 to 200 miles

Model 124 Line Fault Analyzer

Now you can locate power, telephone or telegraph line faults instantly and accurately under all weather conditions. Sierra Model 124 Analyzer eliminates virtually all lost time, hard work and hazard of finding breaks, shorts, opens or other discontinuities. Operating from a powerhouse, transformer bank, substation or terminal point, it pinpoints faults from ½ to 200 miles away with accuracy of ±1 mile on the 200 mile range.

The Analyzer operates on radar techniques, sending a high amplitude pulse along a conductor and presenting echoes from discontinuities as pips on a radar-type "A" scope. Operation is extremely simple, and distances are read direct in miles. Calibrated sweep ranges of 5, 25, 50 and 100 miles are provided. A sweep delay extends range to 200 miles, or permits line segments as small as five miles to be presented full-screen. A movable distance marker can be ranged from 5 to 100 miles.

Model 124 weighs just 59 pounds; and is completely contained in a weatherproofed carrying case.

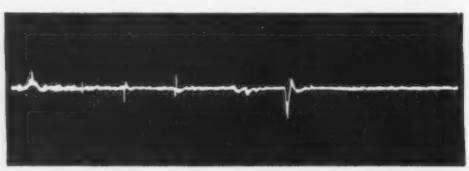

Figure 1

Test on 60 kv line, instrument on 100-mile sweep. Negative pip to right of center indicates line grounded at 60 miles. Other pips are switchyards, transformer bank, substation tap, carrier coupling capacitor, change in line configuration.

Copyright 1953 Sierra Electronic Corporation

For complete details, see your Sierra sales representative or write direct for Bulletin 102B

sierra

Sierra Electronic Corporation
San Carlos, California, U.S.A.
Sales representatives in major cities

Manufacturers of Carrier Frequency Voltmeters, Wave Analyzers, Directional Couplers, Wide-Band RF Transformers, Custom Radio Transmitters.

Rectifier

A Model SR2 Nobatron-Ranger rectifier that converts 115 v ac to regulated dc of 100 to 300 v at 1 to 10 amp has been announced. Output regulation is said to be ± 0.25% at any voltage setting; ripple is 1% rms maximum. Meters and controls are arranged on a panel of the self-contained unit.

Sorensen & Co, Inc, Stamford, Conn.

X-Ray Unit

Fitting into the trunk of an automobile, the unit is designed for rapid inspection of welds, pipe lines, and power plant equipment. X-ray tube head contains a 150,000-v generator and weighs 143 lb. Accompanying control weighs 80 lb.

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Be sure to notify us at once, so future copies of ELECTRICAL WORLD will be delivered promptly.

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SEE HOW VERSATILE PEER-LITE IS:
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Write today on your letterhead for our folder 900-H.
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J. Neils Lumber Company

Much of the finest transmission and telephone pole timber in the United States grows on the 200,000 acres of forest empire owned by the J. Neils Lumber Company in Western Montana. And a large percentage of this magnificent stand is Western Larch.

The larches produce straight, tall stems, the wood of which is strong, durable. Western Larch has high bending strength, high compressive strength, unusual hardness. In shock resistance, one of the most desirable characteristics in poles, Western Larch ranks the highest of the commercial softwoods.

Possessed of the qualities of long life in their original, untreated form, J. Neils literally gives Western Larch poles *double-life* through the technical processes of a modern treating plant—thus making available transmission and telephone poles of extra durability and long service.

An illustrated folder on J. Neils treated Larch poles, and information regarding their application to your requirements, will be furnished gladly on request.

Double-Life *Western Larch Poles*

J N *J. Neils Lumber Company*

Pole Division: LIBBY, MONTANA

Tube is fan cooled and measures 10⅝ x 35 in. Power supply for MG 160 can be either 115 or 230 v ac. Current drain is 20 amp.
North American Philips Co, Inc, Mount Vernon, N. Y.

Plug-In Switch

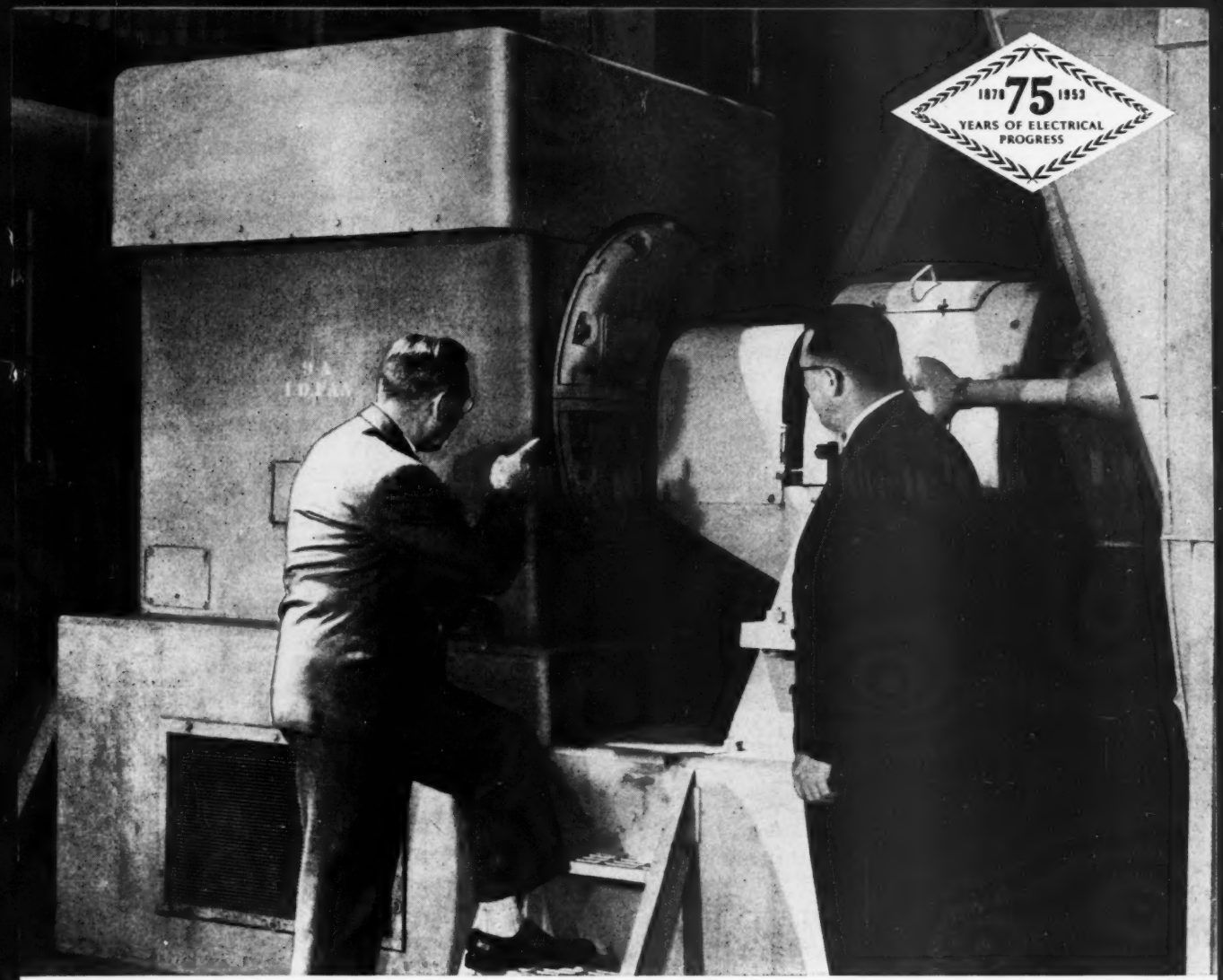
The FG Flex-A-Plug has been developed for getting power from a Flex-A-Power overhead busway to machines blow. It works on the principle of putting a plug into a socket and is supported in place by hanger clips.

Interior of the unit consists of the company's HCI safety switch. This is connected to the bus bars by copper prongs, which are protected by steel side shields. Prongs are further protected by a phenolic shield, which encases them and also provides electrical insulation. Plugs are available in 30, 60, 100, and 200 amp ratings.
Trumbull Electric, Dept of General Electric Co, Plainville, Conn.

Magnet Wire

An insulated magnet wire has been developed for Class B applications where temperatures range up to 105F. Insulation on Roetemp magnet wire is a laminated combination of asbestos paper and Mylar A polyester film, single wrapped with 25% overlap, and bonded to the conductor.

Available in square and rectangular conductors, the wire is said to feature dielectric strength of 4,630 v, good mechanical strength, no irritating fibers, bends without cracking, no insulation unraveling, and fast winding speeds.
John A. Roebling's Sons Corp, Trenton 2, N. J.



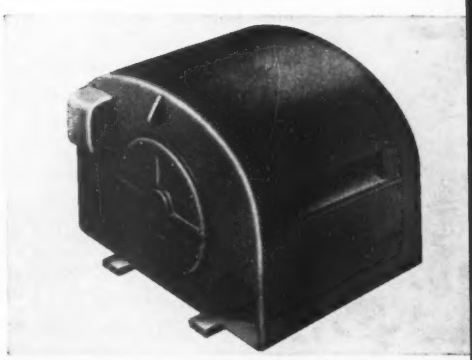
DALLAS POWER & LIGHT SAYS:

"G-E Weather-Protected Motors Give Us Dependable Service."

The Dallas Power & Light Company reports complete satisfaction with G.E.'s Weather-Protected Motors, used to drive induced draft fans. Developed by General Electric in 1949, they are the first successful outdoor ambient breathing motors—give outdoor protection at lowest possible cost.

General Electric's Weather-Protected Motors are available as Base Ventilated for high shaft applications and as Grade Mounted for low shaft applications. They have an effective low air velocity, air reversal system which practically eliminates moisture, dust, and other foreign materials from the cooling air.

For full data, contact your G-E Apparatus Sales Office or write for Bulletin 5810 to General Electric Co., Section 753-4, Schenectady 5, New York.



GRADE MOUNTED Weather-Protected Motors are designed so that driven rain, etc. blows *through* the air inlets—not into motor.

GENERAL ELECTRIC

LETTERS TO THE EDITOR

Appliances for Blind

To the Editor:

I have been conducting classes in electric cooking for blind homemakers for several months. The group meetings have been suspended for the summer, during which time I am giving the ladies individual instruction in their own homes, on any phase of home making they need.

These blind students are making great progress in the better use of ranges and other electrical appliances. However, these appliances were made for sighted persons, and do not provide the same convenience, safety, and pleasure sighted homemakers enjoy.

The blind need appliances especially designed for them. As far as I have been able to determine, there are none on the market. Doubtless there are thousands of blind men and women in the United States who would benefit from a special line of appliances. I believe only a few minor changes in dials, switches and automatic features on existing designs would solve the problem.

Probably the only reason special appliances are not already available is that manufacturers are not aware of the need. If you would point out this need, blind homemakers would be forever grateful.

Rosa Lee Armstrong
Home Service Representative
Carolina Power & Light Co
Raleigh, N. C.

For the TVA Record

To the Editor:

Why don't you play fair?

On pages 14-15 of the June 22 issue of Electrical World is an article on public opinion of the electric utility industry. Charts on six significant issues are published in connection with this article. One chart, which purports to show the trend of public approval (and to infer disapproval) of TVA during the past ten years, shows only one side of the issue. Factual and objective reporting would have required an additional line near the bottom showing public disapproval and some kind of graphical representation of the "no opinion" twilight zone. It is significant that this chart is the only one which fails to disclose the votes for, against, and no opinion.

It is recognized that the whole story is contained in the text, but the charts are published, presumably, to convey information to readers who do not take time to read the whole text. The chart is false because it misleads the reader from the whole truth. It leaves the impression that 45% of the people disapprove TVA instead of the true figure of 14%.

. . . charts must be kept simple and understandable at a glance but I am convinced that a line near the bottom of the chart showing the percentages of public disapproval . . . would have introduced no complexity which was not present in each of the other five charts. I believe that if the chart were to be published at all such a line should have been shown. It would have made a much more nearly complete presentation and would have precluded an impression of bias on the part of your staff.

C. W. Force

Knoxville, Tenn.

• Electrical World still depends upon the written word to give all the facts. In the text of the article in question it was said: "But only 14% disapprove of TVA. The other 31% have no opinion."

Up-to-Date Facts

To the Editor:

I wish to comment concerning a news item "B.C. Engineer Questions Limit on Job Activities" on page 34 of the May 11 issue of Electrical World which does not, I fear, give the complete up to date story on this case.

Mr. Lionel, the engineer in question, did, as you state, two jobs for the architect, Mr. Nicolls; one being in the field of structural engineering and the other in electrical engineering. The B.C. Supreme Court ruled that:

• With respect to the structural engineering, Mr. Lionel was not entitled to collect fees because at the time that he did this work, he was not registered as a professional engineer.

• With respect to the electrical engineering, that he was not entitled to professional fees since he was registered as a chemical engineer and was operating outside of this field, although he was, at the time, registered as a professional engineer.

The Court of Appeal, however, although it supported the B.C. Supreme Court with respect to the structural engineering, reversed the decision concerning the right of a professional engineer to collect fees for work done outside of the field in which he is registered.

J. A. Merchant
Professional Engineer
The Association of Professional Engineers
Vancouver, B. C.

Correction

In the steam station cost survey issue of July 13 it was stated on page 136 that "investment in fuel handling facilities varies as much as 2½ to 1 but . . . the outlay is seldom above $3 per kw." The word "fuel" should have been "ash."

Aluminum Cable Holds

To the Editor:

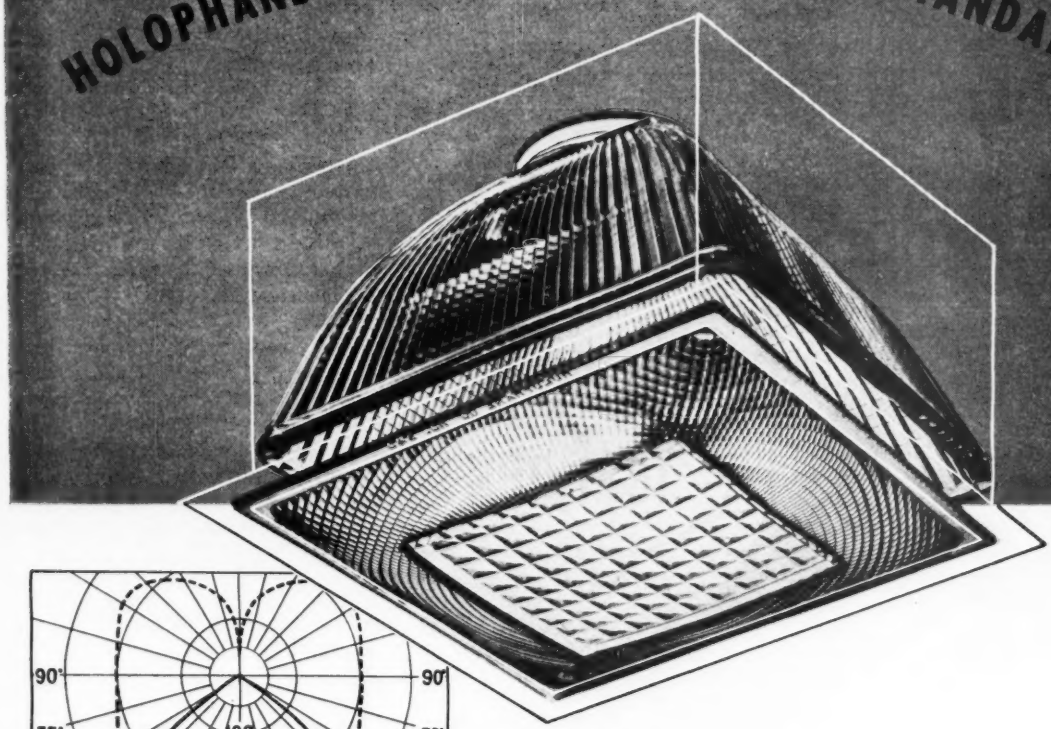
You will be interested to know that several weeks ago we had a very sudden windstorm of high velocity, averaging between 50 and 60 mph that held on for about 30 minutes. During its height many trees were uprooted and hundreds of tree limbs torn loose and thrown against our lines.

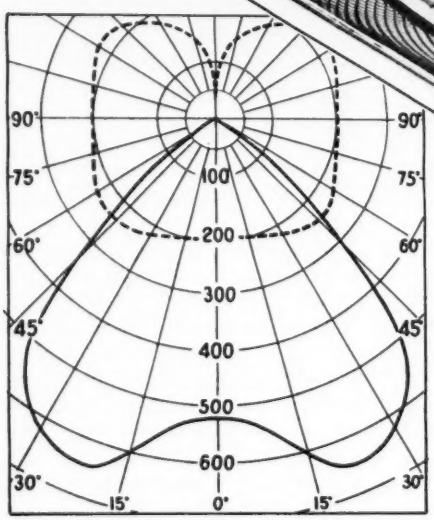
Of the 700 or 800 house services which we had wholly or partially broken down, not one of them was a house service in which we used twisted aluminum cable, but all were of the single conductor type we used to use.

I checked this particularly with our operating people and it seems to me this is one of the benefits the industry has derived from the use of aluminum service cable. The hooks which we attach to the houses to support the cable have a ¼-in. thread on them, whereas the usual screw knob for the other type service has a ⅜-in. thread, so it doesn't mean the aluminum cable has stronger attachment to the house.

S. R. Finley
General Superintendent
Electric Power Board of Chattanooga
Chattanooga, Tenn.

HOLOPHANE-ENGINEERED TO SET NEW STANDARDS





Distribution—NO. F-1540 with 150 Watt Lamp

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- **SCIENTIFICALLY DESIGNED . . . by Holophane Engineers, these units provide (1) high output (2) controlled distribution (3) minimum glare.**
- **NEW PRISMATIC PATTERN . . . of the drop-trim Dished CONTROLENS produces the utmost in architectural beauty as well as effective illumination . . . intensive light pattern . . . 1.25 spacing ratio.**
- **MODERN CONSTRUCTION . . . conveniently sized to fit standard acoustic block. Available in two depths—8⅞" and 4½"—for normal and shallow headroom.**

Architects, engineers and contractors are invited to write for complete data, without obligation.

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Elegant and Efficient Lighting for

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Lobbies
Private Offices
Residences
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- Conductor doesn't have to be centered for accuracy, (toroidal wound transformer)
- Pocket-size, belt-mounting
- Covers 9 ranges
- Probe jaws completely insulated
- Test lead plug insulates itself when removed from meter
- No-rim window floods scale with light

only
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has these features!

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0-15/30/60/150/300/600 amps A-C
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$59.50 complete with cowhide case and voltage test leads.

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Measures current instantly without interrupting service

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NEW!
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PICK THE RANGE THAT FITS THE JOB:
Model "10": 0-10 amps AC. 0-125/250 volts AC.
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Model "50": 0-50 amps AC. 0-125/250 volts AC.
Model "100": 0-100 amps AC. 0-125/250 volts AC.
Write for Catalog No. 132

WHAT THEY'RE SAYING

At Industry Meetings

Service Rendered Must Match Price Received

DON G. MITCHELL, chairman of the board, Sylvania Electric Products, Inc, at convention of National Association of Electrical Distributors

Experience shows that no channel of distribution, nor any link in a chain of distribution, can continue in business unless it provides a service commensurate with the amount received for rendering that service. Mass distribution has as a primary concept a gradual reduction of the spread between what it costs the manufacturer to produce and what the user pays. There must be better efficiency in every link of the chain, starting with the manufacturer's own selling methods and on down to the final sales contact with the user.

Public Must be Helped As Well as Served

DR. C. S. WYAND, assistant to the president, Pennsylvania State College, at Industrial Sales Conference, Pennsylvania Electric Association, Wernersville, Pa.

The historical record is clear that, in the realm of technological research, in the improvement of service to profitable areas of the market, and (to a far lesser degree) in economy of operation, the private power companies have done a creditable job. But, somewhere along the line, utility management lost track of the relationship between public service and the retention of its private franchise.

You can, with logic, say that private power companies had never before assumed such wide responsibility for public welfare. But does that give private power company executives the right to ignore environmental changes and the changing needs of its customers? Where is the much-vaunted vision and ingenuity of private enterprise if it not only remains indifferent to public need, but insists on denouncing that public if in desperation people agree to change the rules to gain their ends. All of you should know by now that the rules and regulations governing our economy not

Have you a fly ash recovery problem?

Bring it to
WESTERN PRECIPITATION

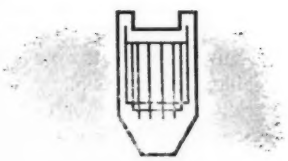
. . . The Only Organization With Years Of "Know-How" In BOTH *Electrical* And *Mechanical* Recovery Methods!

If you have any kind of a suspension-recovery problem—whether dust, fly ash, fume, fog or mists—it will pay you to bring it to the leading organization in the field . . . WESTERN PRECIPITATION CORPORATION. Western Precipitation not only pioneered, over 44 years ago, the first commercial application of the now-famous COTTRELL Electrical Precipitators, but also has been a leader for many years in the *mechanical* recovery field with its widely-accepted MULTICLONE Collectors.

Result:

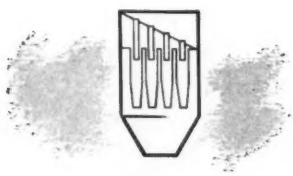
Western Precipitation is unsurpassed in the all-important factor of "know-how" in BOTH the electrical and mechanical fields . . . knows from years of first-hand experience whether your particular problem can best be solved by mechanical or electrical methods—*or by a combination of the two* . . . can give you a direct and unbiased recommendation on the matter . . . and then can provide the complete installation under *one* responsibility, *one* overall performance guarantee, even where Combination Multiclone-Precipitator (CMP) installations are made!

Western Precipitation products and services include . . .



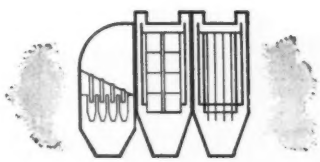
COTTRELL
Electrical Precipitators

. . . the most efficient recovery equipment for high recovery, long life, low maintenance on practically any type of suspensions, wet or dry. COTTRELLS can be designed to handle a few c.f.m. —or millions—with equal ease, and at virtually any operating temperature. Recovery efficiencies closely approach 100% recovery, if desired, with very low draft loss, minimum power costs and negligible labor costs. *By all standards, Western Precipitation* COTTRELLS *give highest recovery at lowest cost per-year-of-service!*



MULTICLONE
Mechanical Collectors

. . . the most efficient, most compact, most trouble-free mechanical equipment for recovering suspensions from gases. Because of their unique small-tube design, MULTICLONES are unsurpassed in mechanical recovery efficiencies—require less space, less maintenance, and are far simpler to install. No filters or screens to replace, nothing to burn or cause fire hazards, no high speed moving parts to repair or replace. These and many other advantages make MULTICLONE Collectors the logical choice on installations where mechanical recovery is selected.

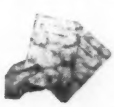


CMP UNITS
(Combination Multiclone-Precipitator)

. . . combine, in *one* compact installation, *both* mechanical and electrical recovery principles so that maximum benefit is obtained from the advantages inherent in each method. The MULTICLONE section centrifugally removes the larger and heavier suspensions (down to a few microns in diameter) . . . and the COTTRELL section then electrically removes the very small particles remaining in the gases. Thus, the bulk of the recovery is obtained with relatively low-cost equipment, and the final clean-up is obtained with equipment having unusually high recovery efficiency—approaching theoretically perfect, if desired.

The recovery of suspensions from gases is a highly exact science and every problem is different. Some require mechanical methods—others electrical methods—still others a combination of mechanical and electrical methods in proper balance to meet the individual requirements of each application. No matter what your problem, remember that only Western Precipitation has had years of field experience in BOTH mechanical and electrical methods!

Send for descriptive literature!



Let our experienced engineers study your recovery requirements and make an unbiased recommendation on the equipment best suited to your particular problem. A wire, phone call or letter to our nearest office places this unique "know-how" at your service, without obligation.

WESTERN Precipitation CORPORATION

ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1004 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
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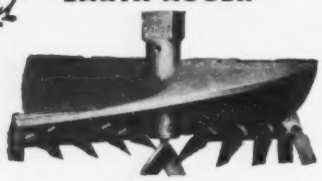
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

MULTICLONE—T.M. Reg.

THESE PENGO PRODUCTS SAVE YOU MONEY!

THE PENGO EARTH AUGER



★ Twin helix—no back thrust!

★ Bores true, clean holes in any soil, most sandstones and hardpans, frozen ground, permafrost!

★ All wearing parts replaceable on job!

★ Made in 22 sizes, 9" to 72" hole diameters, to fit all makes of heavy-duty earth boring machines. Larger sizes on order.

THE PENGO CUTTING HEAD

★ Easy installation—welds to your present helix.

★ Bores where you never could before!

★ Wearing parts are replaceable on the job and are interchangeable with PENGO Auger parts. *(Described at left.)*

★ Made in 11 sizes, 8" to 24" diameters. Larger sizes on order.

THE PENGO WISDOM TOOTH

★ All PENGO Augers and Cutting Heads are equipped with the drive-on PENGO Wisdom Tooth, specially designed for use on earth augers; cast from special abrasion and shock-resistant steel alloy for *far* longer service life!

"Get the PENGO WISDOM TOOTH—It knows how to bore holes!"

★ SAVE HOURS . . . SAVE DOLLARS!

WITH

PENGO *Triple Flight* ANCHOR AUGERS

***Especially designed to bore holes for* EXPANDING ANCHORS**

★ Double-helix cutting head eliminates back-thrust, quickly bores true and clean.

★ Triple-flight single helix carries bigger load of dirt from hole . . . you can complete a hole with less than half the trips down and up!

★ Extra-long auger with small-diameter center shaft leaves plenty of room for dirt and rocks . . . no clogging or jamming!

GET THE PENGO *"Wisdom Tooth"* IT KNOWS HOW TO BORE HOLES

★ Uses same fast-cutting replaceable PENGO Pilot Bits and PENGO Wisdom Teeth used on all PENGO Earth Augers and PENGO Cutting Heads.

★ Available in 9", 11" and 13" diameters for 8", 10" and 12" expanding anchors, respectively, to fit all popular makes of earth-boring machines.

★ ORDER NOW—OR WRITE FOR FREE LITERATURE, PRICES

PETERSEN ENGINEERING CO.

MANUFACTURERS

SANTA CLARA, CALIFORNIA

Use this Handy coupon!

SEND COMPLETE LITERATURE AND PRICES ON

☐ PENGO earth augers

☐ PENGO cutting heads

☐ PENGO anchor augers

CLIP THE ATTACHED TO POSTCARD OR BUSINESS CARD

only can be changed, they are changed and changed frequently. The public will be served. If you choose to serve them, they may let you do so; if you fail to meet their requirements, they will drop you without compunction. And all of your clamor about rules and precedent and the American way of life will get you nowhere.

Area development offers a crystal clear example of this truism. It is astounding to me that so many power companies have yet to see the elementary dollars-and-cents worth of area development to their own corporate prospects and profits. But the thing that really alarms me is that such blind indifference to public need is forcing the American people to turn from you to government for the help they need in resolving their area problems. Communist zeal never rendered the cause of socialism better service in this country than does such indifference by leaders in private enterprise.

It is my conviction that if public utilities are to survive under private ownership and operation, private enterprise must assume an ever wider responsibility for the public good—whatever that is. Whatever the rules and responsibilities of business have been in the past, you will now help the public, or the government will—at the public's request, and at your expense.

Man Has Choice To Build or Destroy

BRIG GEN DAVID SARNOFF, chairman of the board, Radio Corp of America, commencement address, Drexel Institute of Technology, Philadelphia

I have sometimes wondered how the course of history might have been deflected and progress impeded, had the power of electricity been dropped upon the world in a terrifying bomb, as was the power of atomic energy. Then, too, the peaceful and industrial uses of electricity might have been obscured for many decades in the smokes of fear and death. Every natural force can be savage if man so chooses.

The electromagnetic waves that guide atomic missiles to their targets can also carry radio and television to our homes and schools. They can educate, entertain, and edify. Man makes the choice.

TRUCK OPERATING PROBLEMS GOT YOU

up in the air...

GET FACTS from your White Representative about the amazing versatility . . . maneuverability . . . efficiency of this great, new White for aerial and tower work. Functional design and ideal weight distribution save time . . . do a better, more economical overhead job.

on the line...

IT'S TODAY'S most modern line truck, too! Saves overall length yet permits full-size line truck with plenty of crew space . . . driving ease . . . safety . . . maneuverability.

underground?

SEE how great a job it does with special equipment and riggings in utility service. Saves valuable minutes of time because it really maneuvers into position, even where going is roughest. More weight up front . . . wonderful visibility and safety.

Go White!

TAILORED to your exact operating needs, WHITES do more work in less time

UTILITIES everywhere tell this same story of efficiency and time-saving when they talk about the White 3000.

It does more work...in less time...at substantial savings.

It's *right* on the job because it's *tailored* to the job.

Find out today, how the White 3000 can help your transportation efficiency now . . . and for years to come. See your White Representative.

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio

For More Than 50 Years The Greatest Name In Trucks

Tice Named Vice President . . .

. . . and general manager of Southern California Edison Co. He will be in charge of all the field departments

H. W. TICE

H. W. Tice, vice president of Southern California Edison Co since 1945, has been elected vice president and general manager of the West Coast company.

He will be senior administrative officer in charge of field departments and their related activities.

Tice joined the company in 1922 as an electrician at Visalia. Following year he was transferred to the general office in Los Angeles as general foreman, and in 1927 became operating engineer. He was promoted to assistant manager of operation in 1937, manager of operation in 1941, and was elected a vice president in 1945.

Albert Made Executive VP

E. K. ALBERT

E. K. Albert has been elected executive vice president of California-Pacific Utilities Co, San Francisco. Formerly vice president and chief engineer, he succeeds the late Charles E. Bramble (see page 190).

D. J. Ley, assistant secretary, was elected treasurer. J. B. Jones was named assistant secretary and auditor.

E. E. Kime, vice president and manager of Eastern Oregon division headquarters, Baker, Ore., was elected director.

Albert, who is a native Californian and a graduate of the University of Southern California, joined the company as chief engineer in 1939. He was elected vice president and director in 1941. He was formerly connected with Southern California Telephone Co, Los Angeles, and Northwestern Public Service Co, Huron, S. D.

W. D. Virtue, vice president and presently secretary of Public Service Co of Colorado, has been elected treasurer to fill the vacancy created by the retirement of **D. G. Guiney,** effective Sept. 1. **H. A. Mitchell,** presently an assistant secretary and an assistant treasurer, will replace Virtue as secretary. Virtue remains as a vice president and Mitchell retains position of assistant treasurer.

Howard E. Ross, senior representative in the commercial development department of Pennsylvania Electric Co, has been appointed director of commercial development for the company's Southern Division. **Earl E. Kifer,** residential sales director in the Southern Division, assumes a similar position with the Northwestern Division. Albert F. Widmann, who held the post Kifer now fills, becomes residential sales director in the Southern Division. The personnel shift is the result of the recent resignation of **Frank R. Knowles,** whose duties have been assumed by Ross and Widmann. Knowles, with the utility 25 years, plans to enter private business as a commercial consultant.

I. MELVILLE STEIN

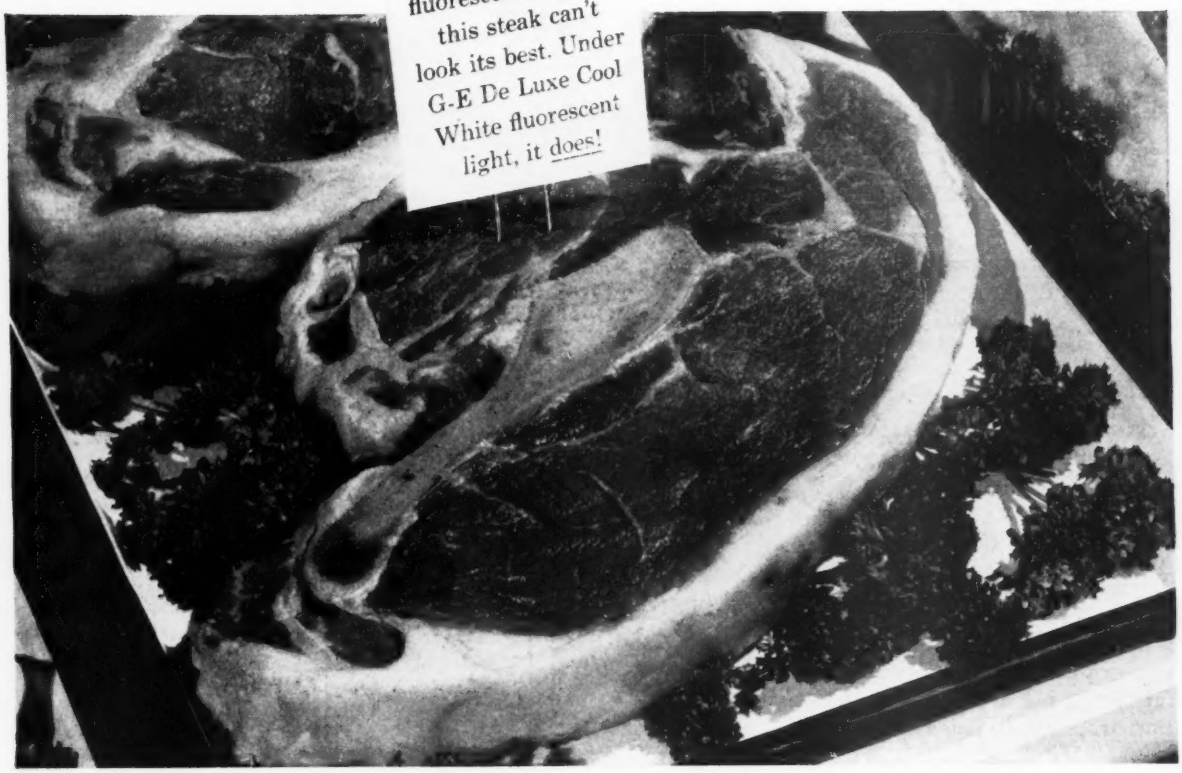
Stein Named President Of Leeds & Northrup

I. Melville Stein has been named president of Leeds & Northrup Co, succeeding Charles S. Redding, who, after 14 years as company president, becomes chairman of the board.

Other changes in managerial responsibilities were also announced. D. H. Schultz, who has been secretary and treasurer since 1940, succeeds Stein as executive vice president, while retaining duties as treasurer. George W. Tall, Jr., vice president, assumes the additional post of secretary.

Stein joined Leeds & Northrup as a salesman in 1919. In 1928 he was appointed director of research. He was elected a vice president in 1944 and in 1951 became executive vice president.

G-E De Luxe Fluorescent lamps show colors as they really are!


● Under ordinary fluorescent lighting, this steak can't look its best. Under G-E De Luxe Cool White fluorescent light, it does!

Everything from foods to fabrics looks better—sells better under General Electric's new fluorescent lamps!

Here's a sales story that every one of your commercial lighting customers will be interested in: fluorescent lamps that bring out *all* the sales appeal of the merchandise they sell!

General Electric calls them De Luxe lamps. Under their light meats, fruits, vegetables look fresher, more appetizing. Lipsticks, rouges, toys, housewares, shirts, suits . . . whatever products your customers display, G-E De Luxe fluorescent lamps make them more inviting, more appealing to shoppers.

And these G-E lamps with their special combination of phosphors flatter complexions too! Shoppers and clerks look healthier, more attractive.

When you talk about G-E De Luxe lamps, you'll find it's easier than ever to sell fluorescent lighting. If a customer already uses fluorescent lighting, suggest he move his old tubes to non-merchandising areas and replace them with General Electric De Luxe lamps. They cost just a few pennies more than the regular fluorescent lamps.

FREE BOOKLET: For more information, send for your free copy of "Color at Your Command", General Electric's new 20-page booklet on De Luxe fluorescent lighting for stores. Write General Electric, Dept. 166-EW-8, Nela Park, Cleveland 12, Ohio.

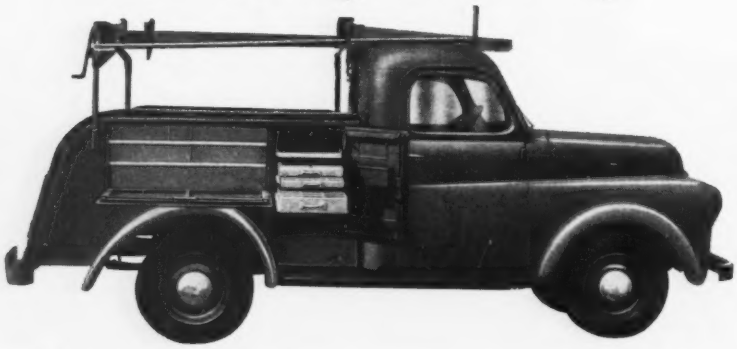
1878 75 1953
YEARS OF ELECTRICAL PROGRESS
Diamond Anniversary

You can put your confidence in—

GENERAL ELECTRIC

YOU get all THREE with YORK-HOOVER UTILITY BODIES

Quality, Performance, and Cost-Saving Efficiency



QUALITY . . . because part-by-part, York-Hoover Utility Bodies are fabricated from top quality materials by expert craftsmen. This means that when you buy York-Hoover Bodies you not only get a quality product at a fair price but a product that gives top performance besides.

PERFORMANCE . . . because each York-Hoover Body is specifically engineered for the job to be done. This, together with the factors of stability, minimum weight, ease of maintenance, and the ability to "take it" in everyday service, makes York-Hoover Utility Bodies the best buy for you.

COST-SAVING EFFICIENCY . . . is the end result . . . the reason why for over 60 years customers from coast to coast have relied on York-Hoover Equipment to give them top performance, low operating and maintenance costs. Enjoy all 3 in '53. Buy York-Hoover Utility Bodies!

York-Hoover Corporation
YORK, PENNSYLVANIA
Body Division

N. Y. Air Brake President Nominated Head of ASME

American Society of Mechanical Engineers has announced the nomination of Lewis K. Sillcox, vice chairman of the board of New York Air Brake Co, as president for 1954 to succeed Frederick S. Blackall, Jr, president and treasurer of Taft-Peirce Manufacturing Co, Woonsocket, R. I.

Regional vice presidents nominated by the society include: Willis F. Thompson, vice president, Westcott & Mapes; Prof William G. McLean, head of Department of Mechanics, Lafayette College; Thompson Chandler, chemical engineer, Carbide & Carbon Chemical Corp; Vernon A. Peterson, district manager, Elliott Co; and Prof Clifford H. Shumaker, director, Institute of Management, Southern Methodist University.

•

T. M. Wallace, manager of General Electric Co's Lexington (Ky) Lamp Works, has been transferred to the lamp manufacturing department at Lamp Division's Nela Park headquarters in Cleveland. **A. D. Dixon,** manager of Ohio Lamp Works at Warren, Ohio, succeeds to Wallace's post, **T. A. Glidden,** manager of Bucyrus, Ohio, Lamp Works, fills Dixon's old post, and **J. W. Wright,** plant superintendent at GE's Memphis Lamp Works, succeeds Glidden.

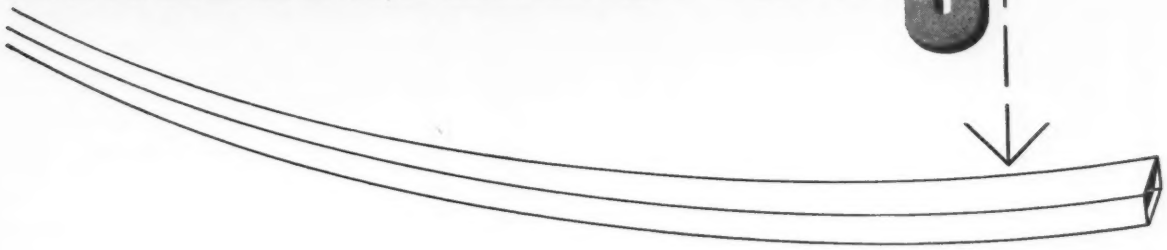
Joseph Browder, formerly sales manager of the Atlanta division of Georgia Power Co, has been appointed manager of the Lighting Division to succeed the late **Philip Peeples** (EW, May 18, p. 252).

Eugene S. Loughlin, president of the National Association of Railroad and Utilities Commissioners has been re-elected chairman of the Connecticut Public Utilities Commission for the year ending June 30, 1954.

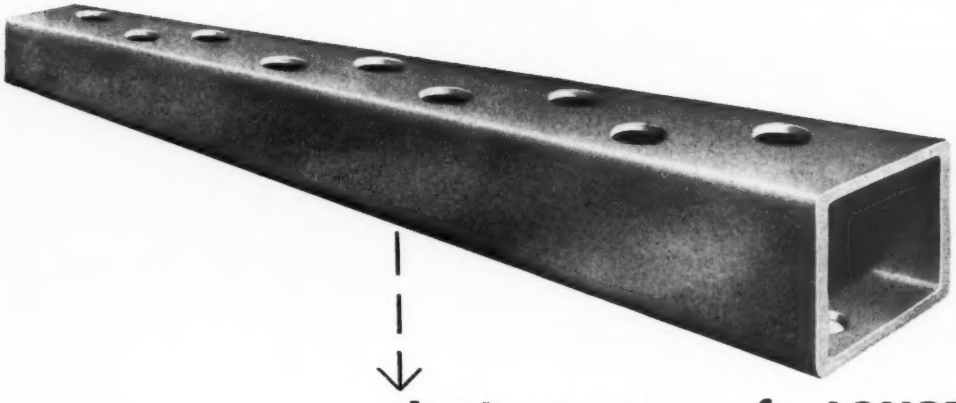
A. Morton Cooper has been appointed manager of application engineering of Westinghouse Electric Corp's Gearing Division. He succeeds **G. H. McBride,** who has been appointed assistant manager of the Switchgear Division at East Pittsburgh.

Jack Hicks has been named manager of Linn County Rural Electric Cooperative Association, succeeding

Minimize Sag



with CHASE® COPPER BUS CONDUCTORS



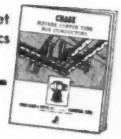
they're stronger...for LONGER spans

Chase one-piece square copper tube buses have high mechanical strength in all directions. Large cross-sectional areas give them maximum structural strength. And that adds up to *longer spans between supports without unduly large sag.*

And, of course, Chase one-piece buses have the mechanical strength necessary to stand up under heavy short circuits.

For further information on Chase ventilated square tube, round tube and flat rectangular bus write for free Chase Bus Conductor Brochure.

FREE Chase Copper Bus Conductor booklet gives physical and electrical characteristics and data on copper saving.



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Waterbury 20, Connecticut

Please send me the
CHASE COPPER BUS CONDUCTOR BOOKLET.

Name_____

Position_____

Firm_____

Street_____

City_____ **State**_____

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The Nation's Headquarters for Brass & Copper

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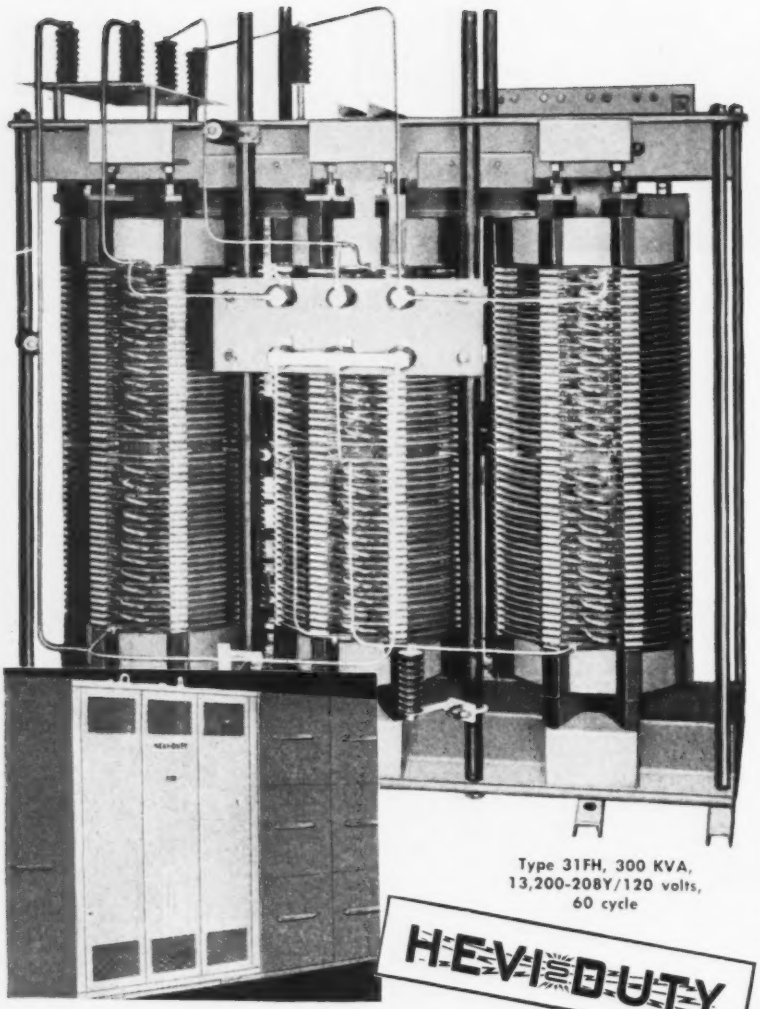
Boston	Detroit	Minneapolis	Providence	
Chicago	Houston	Newark	Rochester†	(† sales office only)
Cincinnati	Indianapolis	New Orleans	St. Louis	



Dry Type Transformers

For High Voltage Unit Sub-Stations

Core and Coil Assembly can be supplied separately or as a Unit Sub-Station complete with primary and secondary switchgear according to your specifications.

Hevi Duty Transformers are designed and built to offer that extra protection needed during peak operating periods. Note the adequate core and coil blocking, high voltage insulators and well ventilated pancake type coils on the transformer shown here.

Specify Hevi Duty Transformers in your unit sub-station and you assure yourself of dependable service.

Let our engineering staff design a transformer to meet your specifications.

Write for Bulletin HD-499

HEVI DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Heat Treating Furnaces... Electric Exclusively

Dry Type Transformers ***Constant Current Regulators***

R. D. Palmer, who had held the post for 15 years. Hicks, who was an engineer with the co-op for four years, holds an electrical engineering degree from the State University of Iowa.

John F. Boyd has been appointed chief dispatcher for Duke Power Co, succeeding **J. Thomas Hutchinson,** who is retiring after 42 years of service in the operating department. At the same time, **H. M. Wheeler** has been promoted from dispatcher to operating engineer.

Kenneth E. Lofgren has been named sales promotion manager of the Permaglas Heating Division, Kankakee, Ill., in addition to his present duties as division advertising manager.

George P. Steinmetz has been appointed to the Wisconsin Public Service Commission for a term ending in March, 1959. Chief engineer for the state commission since 1935, he received his degree in civil engineering from the University of Wisconsin in 1923.

OBITUARY

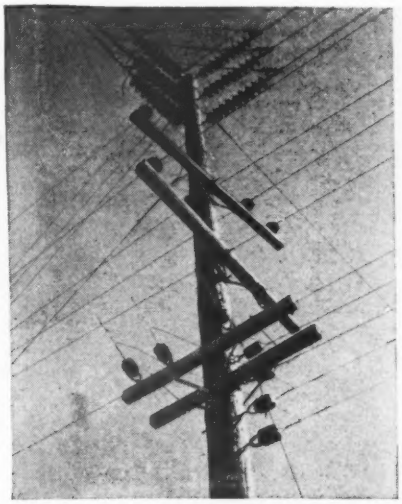
Charles E. Bramble

Charles E. Bramble, 61, vice president and treasurer of California-Pacific Utilities Co, San Francisco, died in Oakland, Calif., July 15. A native of St. Louis, he began his career in 1914 as an accountant in the transportation utilities field. In 1929 he was elected secretary-treasurer of various Ohio, Michigan, and Pennsylvania subsidiaries of National Electric Power

Here's Proof of Performance...

304 pressure-creosoted poles installed in 1915

—more than 90% are still in service after 38 years



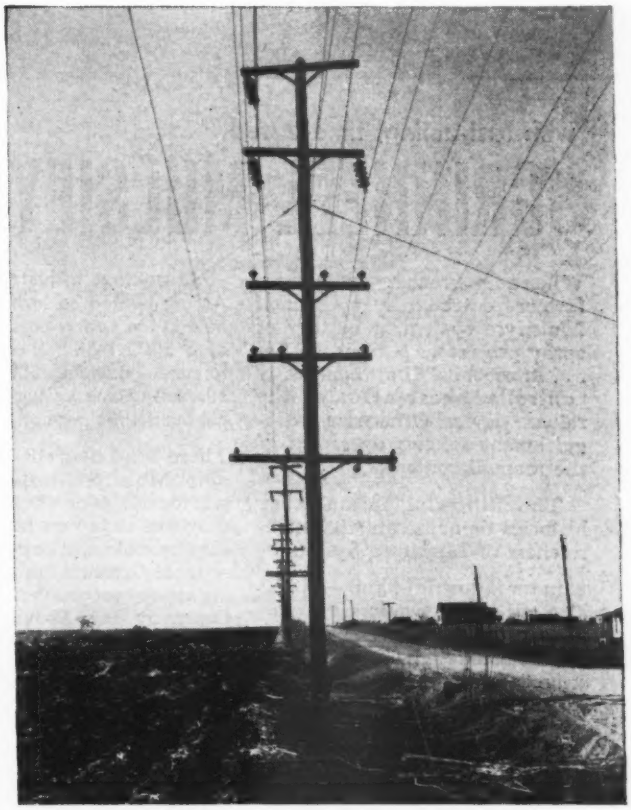
IN SERVICE since 1915, this pressure-creosoted pole supporting 66 and 22 kv lines, as well as Company telephone lines, is located in the Eddy-Temple Line of the Texas Power and Light Company.

● Texas Power and Light Company—a long-time user of Creosote Oil as a wood preservative—has in its files many outstanding service records of pressure-creosoted poles. One of the most interesting concerns 304 poles on the Eddy-Temple Line of the Company.

More than 90% of these Southern Yellow Pine poles—originally installed in 1915—are still giving excellent service. This excellent record has been established in spite of an annual average rainfall in the area of 46 inches and hot, dry winds of summer that sweep across the prairie. And in the next five years, only about 10% of the poles are scheduled for replacement.

Such service records are typical of poles treated with Creosote Oil. And they are the principal reason why Creosote Oil is, and has been for many years, first choice as a pole and crossarm preservative.

When U·S·S Creosote Oil is used, you can count on top performance from pressure-creosoted wood. U·S·S Creosote Oil is a uniform product, made by continuous processing in the world's largest tar distillation plant. For complete information, contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

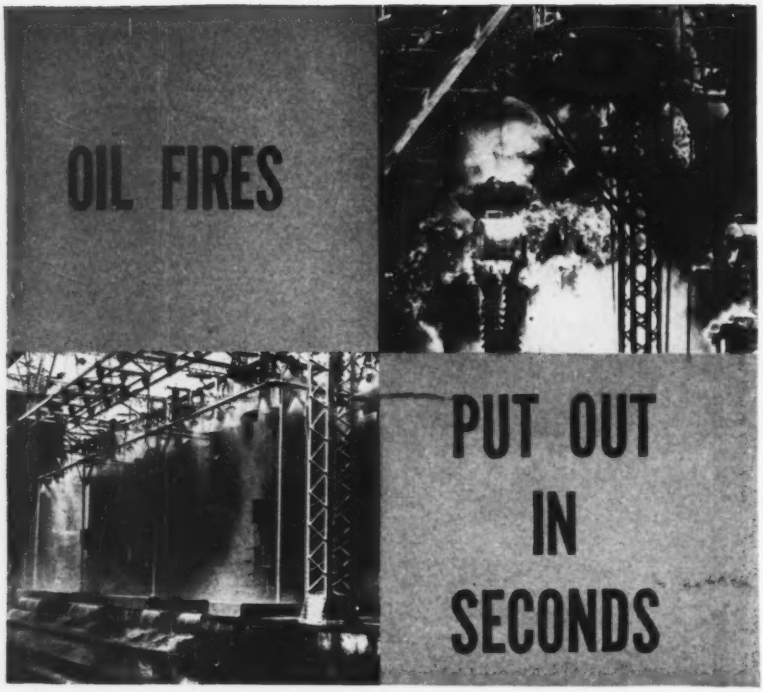


MORE pressure-creosoted Southern Yellow Pine poles in the same line of Texas Power and Light Company. Additional years of service are anticipated from most of the remaining poles.

U·S·S CREOSOTE OIL

3-1619

UNITED STATES STEEL



with fast-acting, time-tested

GRINNELL MULSIFYRE

When a fire breaks out in a transformer protected by a Grinnell Mulsifyre system, a battery of spray projectors put out the fire . . . in seconds! If automatically controlled, heat actuates the release device. Otherwise, extinguishment follows operation of the manual controls.

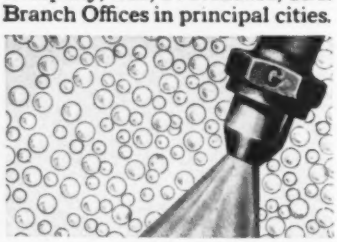
The following actual case histories demonstrate the effectiveness of Mulsifyre Systems.

In an Industrial Plant — A 750 KVA self-cooled transformer explosion blew off the transformer cover and fire occurred. The automatically controlled Mulsifyre System extinguished the fire in a few seconds.

At a Paper Mill Power Plant — Turbine oil escaped under pressure and flashed from 660 degree steam connections. The manual operation of a fixed Mulsifyre System extinguished the fire at once.

At another Industrial Plant — An arc burned an inch and a half hole in the casing below the cover of a 5000 KVA self-cooled transformer — dumping 300 gallons of oil. An automatic Mulsifyre System put out the fire promptly.

There are hundreds of dependable Mulsifyre installations in service all over the world. Get the facts today on how you can save trouble and expense with a reliable Grinnell emulsion-forming spray system. Write Grinnell Company, Inc., Providence, R. I. Branch Offices in principal cities.



GRINNELL *Mulsifyre*

EMULSION-EXTINGUISHMENT OF OIL FIRES

Co, New York. He became vice president and treasurer of the Ohio and Indiana subsidiaries of United Public Utilities Corp in 1932. In 1941 he was named to the position he occupied with California-Pacific Utilities.

John H. Thomas, meter department head of the Binghamton division of New York State Gas & Electric Corp, died July 19 in Binghamton. He had been associated with the utility for 32 years.

Edward A. Andersen, 41, chief test engineer at Philadelphia Electric Co for 18 years, died in Philadelphia, July 24. He was formerly associated with Delaware Power & Light Co, Wilmington.

A. H. Englund, 86, former chairman of the board of Electric Service Mfg. Co, Philadelphia, died recently. He had retired in 1948.

Frank McArdle, 56, sales manager and director of Central Cable Corp, Jersey Shore, Pa., died in Williamsport, Pa., July 21.

Oliver E. Curtiss, 76, former manager and treasurer of Kennebunk Light & Power District, Kennebunk, Me., died recently. He was manager of the utility from 1920 to 1949.

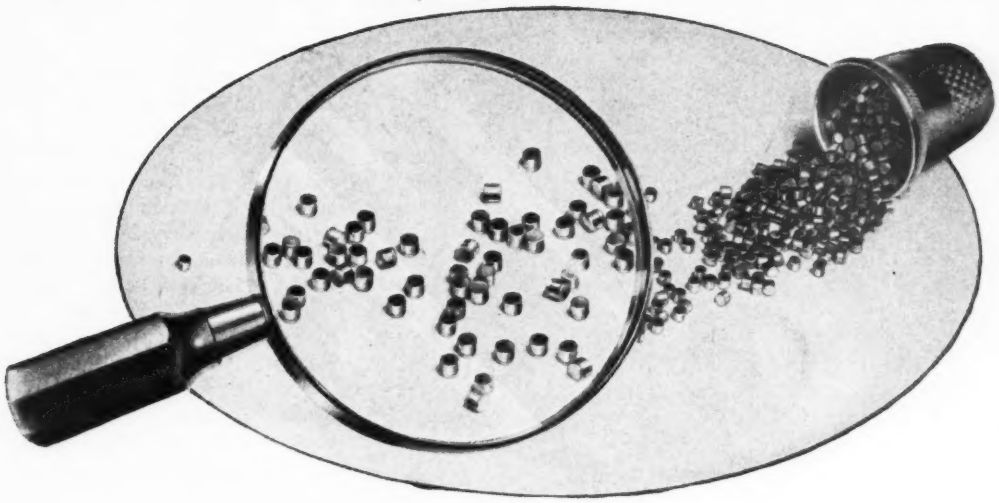
George E. Graham, 67, chief engineer of the East Bridgewater generating plant of the Brockton Edison Co, died at Brockton, Mass., July 20. He was formerly an engineer at the affiliated Somerset station of the Montaup Electric Co.

Elroy M. Arnold, 51, superintendent of overhead construction for Kansas City Power & Light Co, died July 23 in Kansas City, Mo. Arnold joined the company in 1919, and was promoted to line foreman in 1927. In 1948 he was advanced to district foreman and in 1949 became superintendent.

Henry A. Holdredge, 79, manager of the former Omaha Light & Power Co, died at Omaha, Neb., recently.

Leland M. LaVelle, 45, manager since 1945 of Central Missouri Electric Cooperative, Sedalia, Mo., died recently. He joined the cooperative in 1939.

Millions of Cycles of Contact Life...



At One-Third the Cost

Nearly a thousand of these contacts will fit in a thimble, yet the accuracy of a gasoline gauge depends on their uniform performance over a life measured in millions of cycles.

The instrument is designed so that the varying width of the contact gap controls the gauge. As a result, the contact gap is extremely critical. Once the gauge is calibrated, the contacts must retain their shape precisely. They have to resist the peening effect of high frequency operation. They must withstand the pitting and erosion of almost continuous arcing and still maintain low contact resistance with light pressure.

For this kind of an application, platinum and platinum alloys would seem to be the logical choice. There is just one drawback . . . the cost. This is where Mallory's experience in contact engineering was able to save the manufacturer two-thirds of his previous cost.

Through metallurgical techniques, Mallory creates new materials by combining the desirable characteristics of several metals. One of these materials is Elkonium 17, a silver-nickel-cadmium alloy which had the required characteristics . . . at a fraction of the cost.

Other Mallory contact materials will meet the requirements of virtually any electrical contact application. Whether your problem involves simple button or rivet contacts—or a complex assembly—take advantage of the experience our engineers have accumulated in the development of over 5000 different types of contacts and contact assemblies. Call us today . . . lower your production costs tomorrow.

Expect more...
Get more from **MALLORY**

In Canada, made and sold by Johnson Matthey and Mallory, Ltd., 110 Industry Street, Toronto 15, Ontario

Electrical Contacts and Contact Assemblies

P.R. MALLORY & CO. Inc.
MALLORY

SERVING INDUSTRY WITH THESE PRODUCTS:
Electromechanical—Resistors • Switches • Television Tuners • Vibrators
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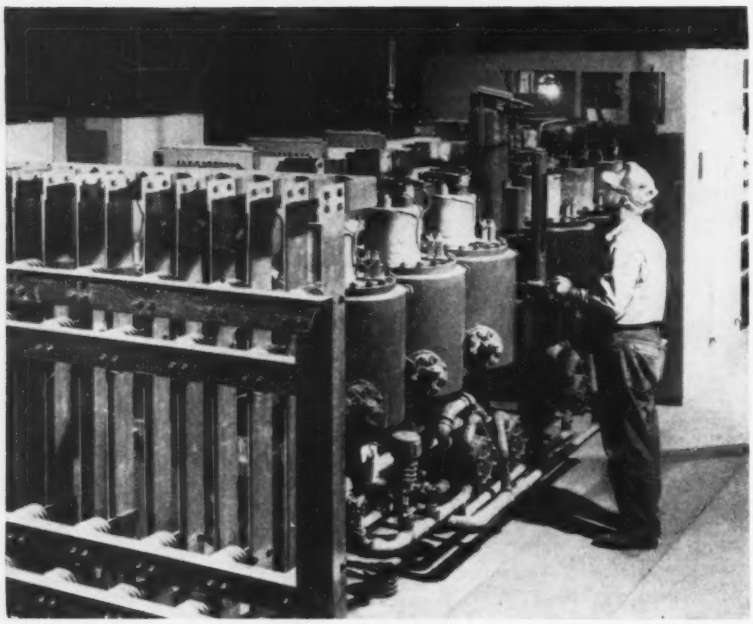
P. R. MALLORY & CO., INC., INDIANAPOLIS 6, INDIANA



ONE OF TWO GE 5,000-kw pumped mercury rectifiers which convert power from 25,000 v ac to 600 v dc for the finishing stand motors of the new hot strip mill at Pittsburgh Steel's Allenport works

Equipment Worth $4 Million . . .

. . . installed by General Electric Co at new hot strip mill built by Pittsburgh Steel Co in Allenport, Pa.

More than $4 million worth of General Electric Co equipment, including drives totaling 34,731 hp, is in operation in the new, $28 million, 66-in. semi-continuous hot strip mill of Pittsburgh Steel Co in Allenport, Pa.

Major portion of apparatus consists of main and auxiliary drive motors, rectifiers, control, and power distribution equipment.

Cutting It Thin . . . The four-high reversing roughing mill, which in five passes reduces a 5-in.-thick slab to .525-in. strip, is powered by a 6,000 hp, 40 100 rpm twin-drive motor consisting of two 3,000-hp, 600-v mill-type reversing motors.

An 800-hp wound rotor induction motor supplies the drive for the two-high roughing scale breaker. The vertical edging rolls of the reversing rougher are driven by a GE 600-hp, 450-v. dc reversing edger motor.

Four 4,000-hp, 600-v motors power four four-high finishing stands which further reduce the strip to a thickness of .093 in. Also supplied was an 8,000-hp synchronous motor-generator set for the installation which includes three 1,750 kw, 600-v dc generators for the reversing-roughing mill and one 500-kw, 450-v dc generator for the edger.

Mercury Rectifiers . . . Two 5,000-kw, pumped-mercury rectifiers convert power from 25,000 v, 3 phase, 60 cycle ac to 600 v dc for the finishing stand motors.

The runout table uses a total of 177 3-hp motors to move the strip from the finishing stand to the down coiler which is driven by a 300-hp mill motor. More than 2,500 hp of small auxiliary motors are included in the drive equipment.

A West Penn Power Co substation with an incoming voltage of 132 kv and 40,000 kva transformer capacity steps the voltage down to 25 kv. Included in the power distribution equipment are four outdoor circuit breakers at the substation with an interrupting capacity of 1 million kva.

An outdoor packaged substation with a 15,000-kva transformer, two 7,500-kva transformers, and metal-clad switchgear reduces the incoming voltage to 13.8 kv and 2.4 kv.

Indoor Switchgear . . . Indoor 13.8-kv metal-clad switchgear feeds the 250-v dc rectifier equipment, the hot strip mill MG set, and the 480-v unit substations. A lineup of 2,400-v indoor metal-clad switchgear is provided to distribute power to the pickle line, hot-roll sheet temper mill, and shear line.

Three 1,500-kva unit substations supply power for the 440-v equipment and a 1,500-kw, 250-v dc unit substation feeds the 250-v equipment.

Other GE equipment includes: all control for the main and auxiliary drives, motor and control for the ventilating equipment, drives and control for cranes and hoist, and an X-ray thickness gage which accurately monitors the thickness of the strip steel as it emerges from the delivery side of the finishing stand.

Record Sales Boost Westinghouse Income

Net income of Westinghouse Electric Corp in the first half of 1953 increased 13.2% over the first six months of 1952 on net sales billed of $780,489,000. Sales were the highest in any six months in the company's history and exceeded by 14.5% first half sales of $681,378,000. New business booked in 1953 exceeded the first six months of 1952 by 23.4%.

MANUFACTURERS' EARNINGS

Company	Period Months Ended		Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
Aluminum Co of America	6	June	$27,133,771	$23,233,236	$2.64	$2.25
Baldwin-Lima-Hamilton	6	June	3,896,997	3,106,973	.81	.65
Bethlehem Steel	6	June	59,495,136	24,304,730	5.87	2.19
Cornell-Dubilier Electric	9	June	1,258,353	1,105,743	2.35	2.05

For Easier Installation

...GREATER HOLDING POWER

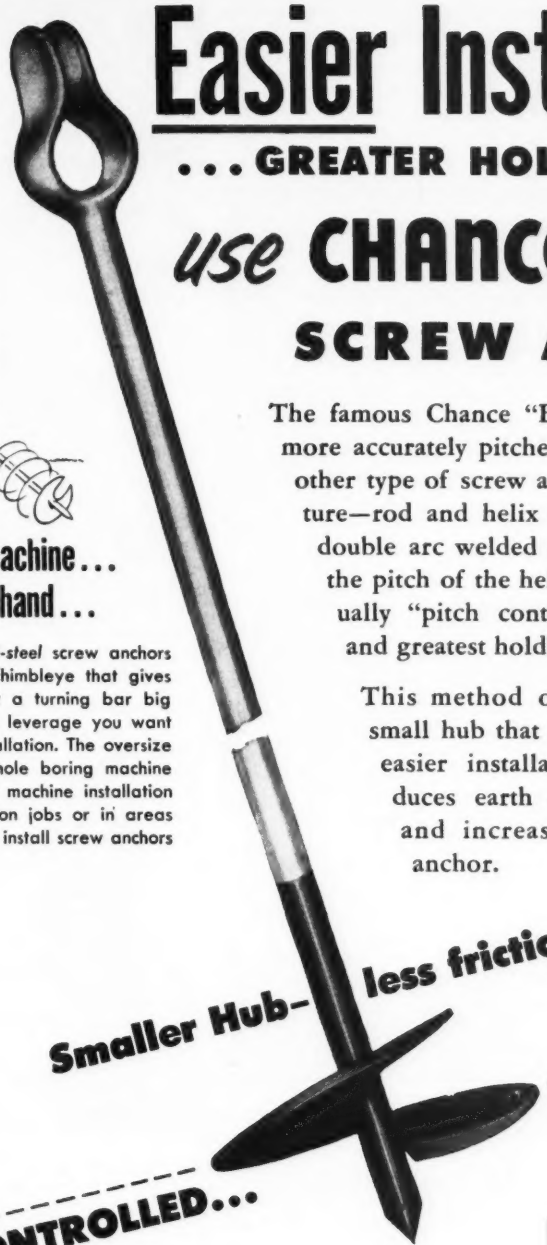
use CHANCE "Blackfoot" SCREW ANCHORS

Install by machine...
Install by hand...

Chance one piece *all-steel* screw anchors have a "king size" Thimbleye that gives ample room to insert a turning bar big enough for the extra leverage you want for speedy hand installation. The oversize eye will readily fit hole boring machine adapters that permit machine installation on big line construction jobs or in areas where it is difficult to install screw anchors by hand.

The famous Chance "Blackfoot" Screw Anchor has a more accurately pitched, faster cutting blade than any other type of screw anchor. The method of manufacture—rod and helix are formed separately and then double arc welded together—puts no limitation on the pitch of the helix. Every size anchor is individually "pitch controlled" for fastest installation and greatest holding power.

This method of manufacture also permits a small hub that creates less friction and means easier installation. The small hub also reduces earth disturbance during installation and increases the holding power of the anchor.

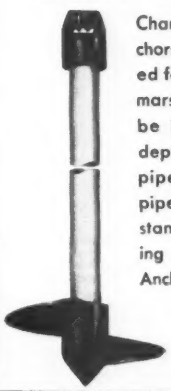


Smaller Hub—less friction

to go down faster!

PITCH CONTROLLED...

CHANCE SWAMP ANCHOR



Chance Swamp Screw Anchors are specifically designed for installation in swamps, marshes, and sand. They may be installed to necessary depth to reach firm soil with pipe wrenches, chain-type pipe tongs, or, where circumstances permit, by hole boring equipment. The Swamp Anchor has a large Tripleye nut to accommodate one, two or three guys.

You know it's RIGHT when you specify CHANCE

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CENTRALIA, MISSOURI
SAN FRANCISCO, CALIFORNIA

ABC INDUSTRIES

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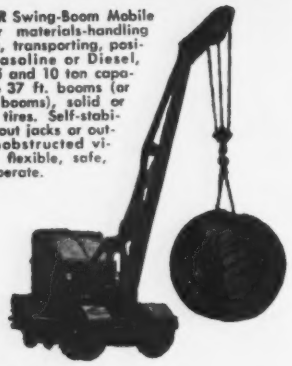
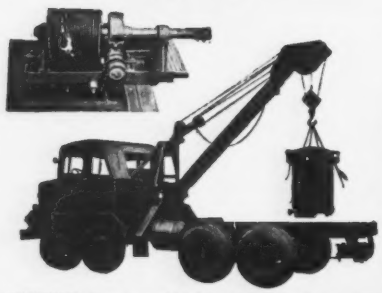
ANCHORS • GUYING FIXTURES • LINE CONSTRUCTION TOOLS • CONDUCTOR CLAMPS
GROUNDING EQUIPMENT • HOT LINE TOOLS • HIGH VOLTAGE SWITCHES • CUTOUTS

Utilities Have Specified
SILENT HOIST Equipment
• Since 1918 •

KRANE KAR Swing-Boom Mobile Crane: for materials-handling . . . lifting, transporting, positioning, gasoline or Diesel, 1½, 2½, 5 and 10 ton capacities, 9 to 37 ft. booms (or telescopic booms), solid or pneumatic tires. Self-stabilizing without jacks or outriggers; unobstructed vision; fast, flexible, safe, easy to operate.





WINCHES: Capstans; Single and Double Drum, Jaw Clutch, Keyed and Friction Clutch Winches. 2,000 to 50,000 lb. Capacities.

SWING-BOOM CRANES: Truck: Motor Power Operated; high capacity; takes up only a small space. For handling transformers, cable reels, lamp posts, trees, poles, manhole castings, etc. 9 to 31 ft. booms; one to 10 ton capacities.

TOWERS: 2 or 3 section type and Pantograph types, with plain, revolving or racking platforms.

TRIPOD POLE DERRICKS: for 35 ft., 45 ft., and 60 ft. Poles; single piece or telescopic side legs; removable cast steel fittings.

USERS: AT&T; N. Y. Tel. Co.; T.V.A.; Consolidated Edison Co.; W.U.; Municipalities throughout America.

WRITE FOR CATALOGS:
No. 79—KRANE KAR No. 70—Truck Equipment

THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER
½, 2½, 5, AND 10 TON CAPACITIES
KRANE KAR
TRADE MARK REGISTERED
SILENT HOIST & CRANE CO.
862 63rd ST., BROOKLYN 20, NEW YORK

Earnings per share were $2.19 on 15,870,271 shares of common stock, against $1.95 on 15,664,239 shares outstanding a year ago, an increase of 12.3%. Net income was $35,660,000 against $31,507,000 a year ago. Earnings per dollar of sales were 4.6 cents for both periods. Net income per share before taxes was $5.95, compared with $5.78 in the first half of 1952.

In the second quarter of 1953, net income increased 17.4% over the second quarter of 1952, earnings per share of common stock increased 16.2%, and sales 11.4%. Net income for the quarter was $18,802,000, against $16,022,000 in the second quarter of 1952; earnings per share rose to $1.15 compared with 99 cents, and sales were $398,263,000 against $357,558,000.

Automatic Insulator Works Begun by GE

General Electric Co's Locke Department has begun construction of its new all-automatic raw materials handling equipment, first of its type in the porcelain insulator industry. The 92-ft high structure will contain 14 silos, capable of storing 56 box cars of raw materials for porcelain. The project will cost nearly a half million dollars, and is scheduled for completion in December. In the above picture J. W. Seaman, general manager of Locke Department, drives the first of 237 concrete piles on which the system will rest. Looking on are K. W. Cermak, manager, manufacturing (right) and W. C. Smitley, manufacturing engineer.

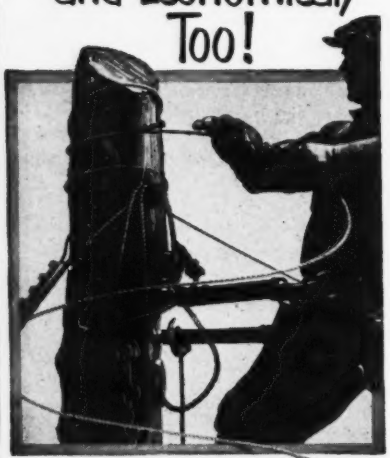
Crapo
GALVANIZED STEEL
STRAND

Strong...
to support pole structures under adverse ice and wind loadings.

Rugged...
to withstand the punishment incurred in construction and service.

Long-Life...
provided by famous *Crapo* Galvanized heavy, ductile, tightly-bonded zinc coatings.

-and Economical, Too!



● Each size and grade of time-proved *Crapo* Steel Strand utilizes the superior tensile strength of steel to the fullest advantage. Next time, *specify Crapo Steel Strand* for guys, messenger and overhead ground wires . . . and *save on maintenance!*

REINFORCE and PROTECT YOUR CONDUCTORS with Preformed ARMOR RODS

Minimize wear and chafing . . . Absorb and dissipate vibration . . . Protect against arcing and flash-overs . . . Increase holding power against slippage . . Lessen possibilities of corrosion . . . *Reduce overall maintenance costs.*

Contact your jobber of *Crapo* Galvanized Products or write direct for further information!

INDIANA
STEEL & WIRE COMPANY
MUNCIE, INDIANA

MANUFACTURING BRIEFS

Charles T. Main, Inc, Boston engineers, have purchased the business of John A. Stevens, Inc, Lowell Mass., an engineering organization of long standing in the field of power plant and industrial construction. The Lowell offices have been closed and personnel transfers made to the Main company's offices at 80 Federal St., Boston.

Jefferson Electric Co, Bellwood, Ill., has received the largest single order for airport lighting transformers placed by the U. S. Air Force since World War II. All transformers in the $1,727,119 order will be rubber covered.

Fargo Mfg. Co, Poughkeepsie, N. Y., will start construction in a few weeks on an extension to increase production area by approximately 15%. The company is also relocating its laboratory and engineering department to larger quarters in a recently acquired adjacent building.

Westinghouse Electric Corp has received orders totaling $4,053,000 for more than 1,000 large electric motors to be used in Atomic Energy Commission projects. The motors will range in size from 350 to 950 hp. . . . Westinghouse also plans construction of two new warehouses for its lamp plant at Fairmont, W. Va. The project will add more than 40,000 sq ft of storage area for fabricated glass.

SALES ASSIGNMENTS

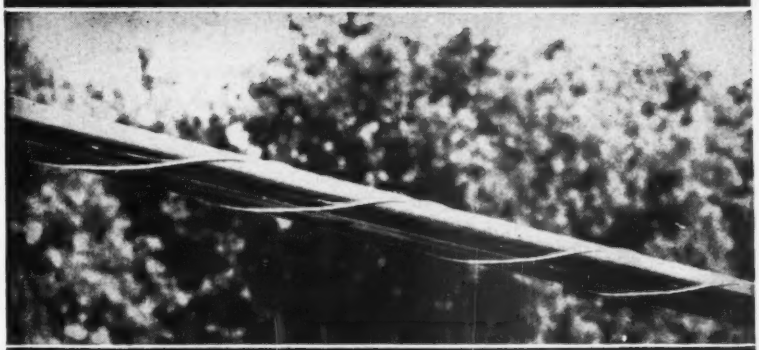
COMPANY STAFFS

Thomas & Betts Co, Elizabeth, N. J., has assigned Myron Bielat to the firm's Chicago sales staff and has designated Billy R. Connor to replace Hugh Holcombe in covering the North Carolina area. Samuel S. Jett, Jr, was assigned to cover the Virginia area except for Danville and Fairfax Counties, reporting to Don Wildauer, Philadelphia district manager. Connor, who reports to Atlanta district manager Fred Shepar, serves Danville County and Edward I. Osborne, Baltimore-Washington sales representative covers Fairfax County.

REPRESENTATIVES

Utica (N. Y.) Drop Forge & Tool Corp has named Ronald A. Larsen, Houston, Tex., as manufacturers representative for its complete line of pliers, adjustable wrenches and screwdrivers in southern Texas and Louisiana.

SPIN CABLE LIKE THIS . . .



THROUGH TREE-CONGESTED AREAS AT MUCH LESS COST . . .

You can save man-hours of wood-cutting and customer complaints when you spin cable through tree-congested areas. What is more, spun cable costs much less to install than pre-assembled cable. Spun cable is so compact that it saves valuable space wherever congestion is a problem.

You save splices and installation labor, because light weight single conductor cables may be spun in lengths three times as long as pre-assembled cables.

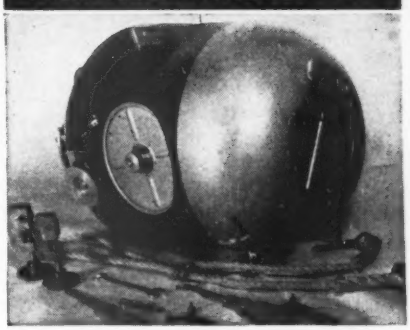
You reduce your cable inventories, because 1/c, 2/c and 3/c cables can be spun in the field as required.

Add to these benefits the extra margin of protection against storm damage . . . and you readily understand why there is a marked trend to cable spinning in the power field.

with NEALE Model "K"

HOW IT WORKS

Drum rotates when its two friction drive wheels respond to pulling of wire. Drum revolves once when 13" of wire is pulled — regardless of condition of strand. Drum carries two spools of wire, each spirals 13" giving support every 6½". Magnesium castings used wherever possible for lightness and strength. Weight: only 36 lbs. Overall length: 18½".



THE WORLD IS SPINNING—TOO!

Cable Spinning Equipment Co.

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For Durable Installations . . .
USE G-E METER SOCKETS
• Baked-on aluminum Glyptal® for long life.
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for LOOSENING
NUTS
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STUDS
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Eliminate the hours your crews spend sawing or struggling with rusted or frozen hardware. Just a few squirts from this handy, easy-to-carry, pressurized can sends an atomized spray into the tightest, hardest to reach spots. KEARNEY RUST CUTTER quickly dissolves rust and corrosion, freeing the frozen part.
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MEETINGS CALENDAR

Western Electronic Show-Convention
Co-sponsored by Institute of Radio Engineers and West Coast Electronic Manufacturers Association; San Francisco Civic Auditorium; San Francisco, Week of Aug. 17.

American Institute of Electrical Engineers
Pacific General Meeting, Hotel Vancouver, Vancouver, B. C., Sept. 1-4; Middle-Eastern District Meeting, Daniel Boone Hotel, Charleston, W. Va., Sept. 29-Oct. 1; Fall General Meeting, Muehlebach Hotel, Kansas City, Mo., Nov. 2-6.

***Edison Electric Institute**
Commercial Sales Section Committees, EEI headquarters, New York, Sept. 3-4; EEI-AGA Accounting Division Organization Meeting, Hotel Statler, Detroit, Sept. 15-18; Accident Prevention Committee, Radisson Hotel, Minneapolis, Sept. 21-22; Prime Movers Committee, Detroit, Oct. 5-6; Transmission-Distribution Committee, Hotel Nicollet, Minneapolis, Oct. 8-9; Industrial Relations Committee, Fall Round-Table Conference, Sheraton Hotel, Chicago, Oct. 12-14; Meter & Service Committee, William Penn Hotel, Pittsburgh, Oct. 19-21; Electrical Equipment Committee, Jung Hotel, New Orleans, Nov. 2-3.

Northwest Public Power Association
Accounting Section, Monticello Hotel, Longview, Wash., Sept. 17-18.

International Association of Electrical Inspectors
Silver Jubilee Meeting, Edgewater Beach Hotel, Chicago, Sept. 21-26.

Great Lakes Power Club
Plankinton House, Milwaukee, Wis., Oct. 1-2.

***Pennsylvania Electric Association**
Relay Committee, Fall Meeting, Irem Temple Country Club, Dallas, Pa., Oct. 1-2; Transmission & Distribution Committee and Electric Equipment Committee, Joint Meeting, Abraham Lincoln Hotel, Reading, Pa., Oct. 8-9.

Southeastern Electric Exchange
Fall Meeting, Engineering-Operation Section, Carolina Hotel, Pinehurst, N. C., Oct. 1-2; Accounting Conference, Battery Park Hotel, Asheville, N. C., Oct. 15-16; General Sales Conference, Atlanta Biltmore Hotel, Atlanta, Ga., Nov. 19-21.

American Society of Mechanical Engineers
Fall Meeting, Sheraton Hotel, Rochester, N. Y., Oct. 5-7; Annual Meeting, Statler Hotel, New York, Nov. 29-Dec. 4.

Indiana Electric Association
Annual Convention, French Lick Springs Hotel, French Lick, Ind., Oct. 7-9.

Association of Edison Illuminating Companies
Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va., Oct. 8-10.

National Association of Electrical Distributors
Fall Meeting Pacific Zone, Hotel del Coronado, Coronado, Calif., Oct. 11-14.

Electrical Association of Philadelphia
Biennial Electrical Progress Show sponsored by Manufacturers' Division, Convention Hall, Philadelphia, Oct. 13-15.

American Standards Association
4th National Standardization Conference and 35th Annual Meeting, Waldorf-Astoria, New York, Oct. 19-21.

***Oklahoma Utilities Association**
Electric Light and Power Division: Eastern District, Vinita, Okla., Oct. 22; Western District, Norman, Okla., Oct. 23.

National Electrical Manufacturers Association
Annual Meeting, Haddon Hall, Atlantic City, N. J., Nov. 9-12.

***Addition this week.**

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the new

1953 McGraw-Hill

Directory of Electric Utilities!

If you're looking for the vital statistics on more than 4,000 electric utility systems in the United States, its possessions and Canada, you'll find them in the 62nd edition of the McGraw-Hill Directory of Electric Utilities. Within its 800 pages, you'll discover complete, up-to-the-minute, *accurate* information covering all private and municipal utilities, REA's, public utility districts, state and federally-owned projects, holding, controlling and affiliated companies. arranged alphabetically by city and state.

More than a mere listing of companies, this directory offers you the names of the operating officials, generating capacity, types of generating equipment, transmission and distribution voltages, types of service, number of customers served, location of plants, and the towns served by each system. In short, if you need the who, what, where or whys of the electric power industry, here's the one place where you'll find all the answers.

You'll find the 1953 edition easier to use, too! While containing approximately 20% more names of individuals, each of the directory's pages has been completely restyled with larger, quicker-to-read type faces, assuring fast easy-on-the-eye reference. Beautifully bound in flexible blue Fabrikoid and fully thumb indexed, this latest edition of the McGraw-Hill Directory of Electric Utilities is now available at the low price of $30 per copy—with a ten percent discount on five or more copies.

Better send your order in today—more than half the supply has already been spoken for by companies with standing orders for each new edition. Just fill out and mail the convenient coupon—we'll gladly invoice you after shipment.

*State Directories Available Too!

For branch offices or companies interested only in limited areas, single state copies are available at minimum prices. However, these state directories can be sold only to those companies who order one or more copies of the complete directory. Write for prices and details.

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improved, indoor-outdoor
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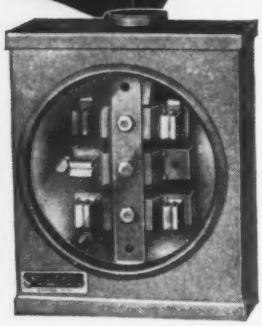

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CANTON, OHIO
A subsidiary of
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The 7-Range Clip-On Volt-Ammeter

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Offers These Important Advantages

- Measures up to 1000 amps up to 600 volts.
- Convenient ONE HAND operation trigger action.
- Thumb operated range selector switch.
- 7 ranges 5 current and 2 voltage.
- Insulated core shockproof construction.
- Takes cables up to 2¼" diameter.
- Distinct calibrations easy to read.
- Suitable for 50-70 cycles.

RANGES: 0-10 *amps;* 0-25 *amps;* 0-100 *amps;* 0-250 *amps;* 0-1000 *amps;* 0-150 *volts;* 0-600 *volts.*

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30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
FERRANTI, LTD., Hollinwood, England — FERRANTI ELECTRIC, LTD., Toronto, Canada

CATALOGS • BULLETINS

● **STREET LIGHTING:** All the information necessary for preparing a planned street lighting program consolidated in a 27-pg booklet has been released. The first few pages present a formula for preparing a street lighting plan in six steps: determining present conditions, classifying each street, establishing lighting needs, establishing an order of preference, selecting equipment, and making the layout. Layout tables give recommended spacings and luminaire distributions for different classes of streets at various spacings. In coordination with the tables, material lists furnish information on the equipment necessary for the various layouts. Lighting of curves, intersections, railroad crossings, alleys, and other situations requiring special consideration are treated in a separate section. For a copy of this booklet (B-5800) write Westinghouse Electric Corp, Box 2099, Pittsburgh 30, Pa.

● **POWER TRANSFORMERS:** A new two-color, 4-pg, illustrated bulletin on the cooling system of forced-oil-air-cooled power transformers has been announced as available by the General Electric Co, Schenectady 5, N. Y. The bulletin (GEA-5969) discusses unit coolers, directed flow, cooling efficiency, flow selector, and control. Included in the publication is a large diagram showing directed oil flow in a power transformer.

● **Garden Lighting:** A new line of garden and residential outdoor play area lighting units is included in a catalog by the Steber Manufacturing Co, Broadview, Illinois. An important item in this new line is the Steber Floralite which is a handy garden light approximately 30 inches high, mounted on an aluminum ground spike for mounting anywhere in the garden or lawn. It is supplied for use with white, colored, or insect repellent lamps. Another Floralite is equipped with metal deep-drawn reflector instead of the glass globe. Play area lights consist of sturdy lampholders mounted to extension poles, one adjustable 5 to 8 ft high, the other 5 to 15 ft high. Bulletin No. 135-53 available upon request to the Steber Manufacturing Co, Broadview, Ill.

● **RECTIFIERS:** A new two-color booklet describing General Electric's complete line of manually-controlled and automatically regulated metallic rectifier power supplies for electroplating and similar processes has been announced as available from the company at Schnectady 5, N. Y. The fully-illustrated, 16-pg publication, GEC-970 describes the advantages, applications, and operation of the units and lists ratings, dimensions, and specifications.

● **FANS:** Vibration and noise isolation bases for fans and motors are described in detail in the new Catalog FB-802 recently published by The Korfund Co, Inc, 48-21-H Thirty-Second Place, Long Island City 1, New York. Designed to give the maximum help possible to architects, engineers, air-conditioning contractors and fan manufacturers, the catalog gives illustrations, descriptions, and specifications for the Twin Rail Base, Vibro-Var Base, Steel Spring Vibro-Isolator, and other vibration isolation equipment manufactured by the company. Case histories are featured; one describes how a contractor, using Korfund Steel Spring Vibro-Isolators, successfully controlled vibration and noise transmission from a fan and motor installed on the roof of a leading Washington, D. C. hotel. The Korfund isolators allowed the rental of the top floor of the building which hitherto had been impossible because of excessive vibration and noise.

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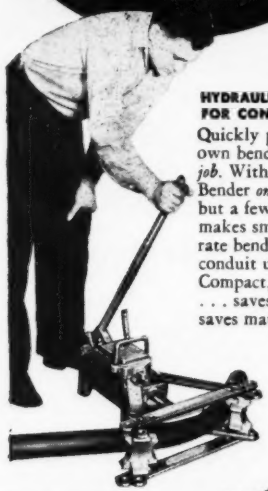

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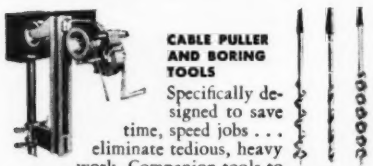

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TECHNICAL LITERATURE

Street and Highway Lighting Equipment Standards—The Joint Committee of the Edison Electric Institute and the National Electrical Manufacturers Association on Standardization of Street Lighting Equipment has announced the publication of the following standards:

EEI-NEMA Standards for Street Lighting Poles, EEI TDJ-135, NEMA 122-1953, April 53.

EEI-NEMA Standards for Materials, Finishes, and Performance Tests For Equipment Used in Street and Highway Lighting, EEI TDJ-139, NEMA 126-1953, April 53.

EEI-NEMA Standards for Metal Head And Reflector Interchangeability (Enclosed Luminaires), EEI TDJ-140, NEMA 127-1953, April 53 EEI-NEMA Standards for Open Reflector Mountings, EEI TDJ-142, NEMA 129-1953, April 53.

Direct requests to National Electrical Manufacturers Association, 155 East 44th St, New York 17. Prices are 30¢, 20¢, 10¢, and 20¢ per copy in the order listed above.

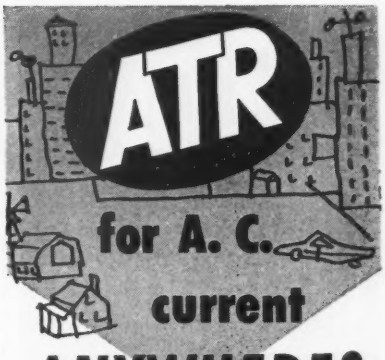
Manual on Machining Glass-Bonded Mica—Mycalex Corp of America, Clifton Blvd, Clifton, N. J. has announced publication of a 23-page illustrated reference and operation manual titled "How To Machine Mycalex Glass-Bonded Mica." Methods of machining to retain stability of dielectric, electrical and mechanical features are described. Copies may be obtained by writing to Mycalex Corp at Clifton, N. J.

Training Film for Wiring with Aluminum—The Motion Picture Division, Aluminum Company of America, 818 Alcoa Bldg, Pittsburgh 19, Pa announces the advailability of a training film for electricians titled "Electrical Wiring With Alcoa Aluminum." A pocket size booklet of the same title is also available to all persons who view the film. Address the above or any sales office, and state the estimated audience in any requests to show the film.

Secondary Network Planning: Publication SA-7303, titled Light Duty Overhead A-C Secondary Network System Planning, has been announced by Westinghouse Electric Corp. A check list of the data required in making a system study preliminary to planning the system is included. Such a study can be facilitated by putting much of the information on a map of the area. Also included is a list of important information that can best be assembled as a list in making the system study. Write to Westinghouse Electric Corp, P O Box 2099, Pittsburgh 30, Pa.

High Capacity Fuses: Bussmann Mfg. Co has announced Form HCS, titled Safe Fuse Protection for Loads above 600, and up to 5,000 Amperes. This release is devoted to the Buss Hi-Cap fuses, which have been tested by the Electrical Testing Laboratories, Inc. because the N E Code and the U L have not set up requirements in the high capacity range stated. Well edited and easy to read curves covering Current Limiting Effect and Opening Time Curves are included in the 6-page issue, along with ratings and dimensions. Write to Bussmann Mfg. Co, University at Jefferson St, St Louis 7, Mo.

CONCRETE BOX-GIRDER DEVELOPMENTS for viaducts. Portland Cement Ass'n, 33 West Grand Ave, Chicago 10, Ill. Structural Bureau issue 28 features a 17-page article, illustrated by photos, charts and diagrams, covering all design features of concrete box girders and single-row supporting columns as built at the Highbridge Interchange of the New York City expressway system. Copies are available on request from the Association.



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3-Way River Fight

PG&E, irrigation district, engineer interested in project on Feather River's Middle Fork

A three-way fight is in prospect for the right to develop the hydroelectric power resources of the Middle Fork of the Feather River in northern California.

Pacific Gas & Electric Co, Richvale Irrigation District of Butte County, and Robert Pierce Wilson, an industrial engineer, have filed applications with the Federal Power Commission for a preliminary permit to study the proposed development.

Wilson has demonstrated he is very serious about going through with his plans by working on an application for the water rights. He has filed numerous maps and other data with the state division of water resources in Sacramento, which has given him until Sept. 1 to complete his filings. The division then will set a hearing on the application.

To Benefit Foundation . . . Wilson, a resident of Taylorsville, Calif., said he has the financial backing for the project. He said it is his aim to construct the project for the "endowment and benefit of a non-profit charitable educational and scientific foundation."

The Wilson plan proposes four main power plants and several smaller high-head power plants with two large storage reservoirs on the Middle Fork and four storage reservoirs on the river's tributaries. Cost is estimated at about $115 million.

The Richvale Irrigation District's application was prompted by a need for an additional water supply for district farmers, who raise rice mainly.

The district's project envisages the construction of two large dams, necessary diversion dams and a series of power houses which would develop 189,000 kw to help pay off the costs of the development.

With huge installations already on other reaches of the Feather, the PG&E foresees the area as a potential source to add to its system in the future as more power is needed in California.

The Middle Fork development would not affect the state's plans for a $1.2 billion project on the main Feather River, including a dam 5 miles upstream from Oroville.

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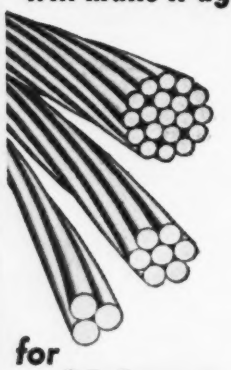

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First Section of New Grid in Britain Is Completed

LONDON (McGraw-Hill World News)—The first section of the new 275-kv "super-grid" for Britain was officially opened last month. This section, between Staythorpe, Nottinghamshire, and West Melton, Yorkshire, had been in operation earlier but at a lower voltage.

This power network is to be completed in 1960 and will then form, it is claimed, the most closely integrated system in the world.

The existing national grid was conceived in 1926, but consumption of electricity, now 51 billion kwhr a year, is nine times greater than it was then, and the present demand is expected to be doubled within the next 20 years. For this reason it was decided to have a new grid and to superimpose it upon the old, to increase the present line construction by 1,200 miles, and to increase the voltage from 132 kv to 275 kv. When originally estimated in 1950, the cost was said to be about $145.6 million.

When the super-grid is completed it will consist of a central ring through Lancashire, the West Riding, and the Midlands. From it two lines will run to London, where they will join a semi-circular ring which will go from Tilbury on the north bank of the Thames round to Littlebrook on the south. There will also be a line to London through the Severn Valley from the Midlands. The central ring will be connected to Scotland via Carlisle and the northeast coast.

USBR Office Studying Utility's San Joaquin Plan

Bureau of Reclamation's new California projects office in Sacramento has begun engineering investigations preliminary to negotiations with Southern California Edison Co on protection of Central Valley Project irrigation water in the event Federal Power Commission grants the firm a permit for the Mammoth Pool hydro project on the San Joaquin River.

The new bureau studies supersede an investigation of construction of the project as a federal government development.

Secretary of Interior Douglas McKay, in a letter to W. C. Mullendore, Southern Cal Edison president, said,

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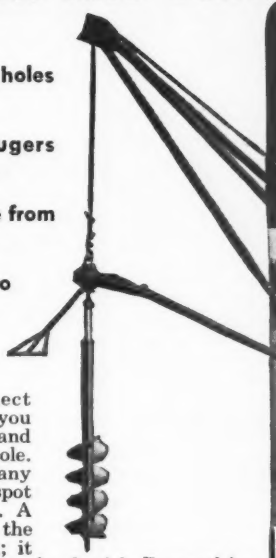

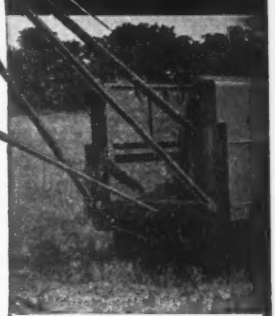

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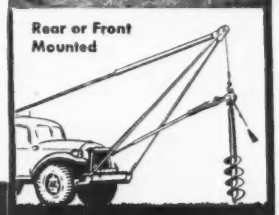

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"We are of the view that no license should be issued" until a satisfactory agreement has been worked out.

No date has been set for the negotiations between the bureau and the power company.

Southern Cal Edison had asked McKay to rescind former Interior Secretary Oscar Chapman's protest to the FPC over the private company's request for a permit to provide for a 125,000-kw development for the winter peaking of power.

Chapman had maintained that under a federal plan 500,000 kw could be developed along with an additional 500,000 acre ft of water for irrigation purposes.

The Chapman protest pointed out the Southern California Edison project would cut down the availability of water in the Central Valley Project's Friant Dam for summer irrigation use.

Peat-Burning Power Plant Is Planned in Scotland

LONDON (McGraw-Hill World News)—An experimental peat-burning power station is to be built at Altnabreas, Caithness, Scotland. Capital and development costs are estimated at $1.4 million.

The plant will consist partly of a 2,000-kw closed-cycle gas turbine of the type developed by John Brown & Co, Ltd, Clydebank Works, Clydebank, Dumbarton, on which both the company and North Scotland Hydro-Electric Board have been working since 1947. (An oil burning turbine of the same type—the first in Great Britain—is expected to be in operation at Carolina Port, Dundee, in three or four months.) A gas turbine burning dried peat has run for 1,000 hours at Clydebank, the results of which were considered promising. The new peat plant is the outcome of this development.

In addition, the project will include a 750-kw open-cycle turbine. It will be installed as soon as it has completed the necessary tests and is in full working order. Initial tests took place last November and the results were described as being satisfactory.

This whole pilot scheme will, it is estimated, take three to four years, and if proved successful, the Hydro-Electric Board plans to proceed with

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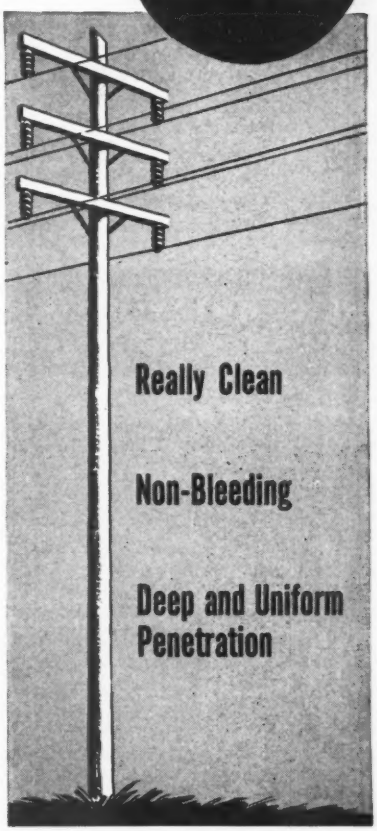

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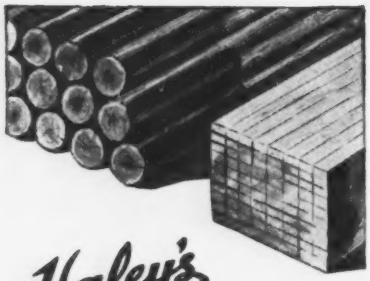

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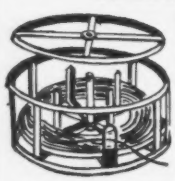

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Stamford Granted Right to Condemn Utility's Land

City of Stamford, Conn., has been granted the right by superior court to condemn for public recreational purposes 84 acres of shorefront property known as Cove Mills owned by Connecticut Light & Power Co. A three-man committee has been set up to assess the amount of damages to be paid the utility.

The company had hoped to build a power plant on the property, part of which is located on the mainland and the remainder on Cove Island off the shore from Stamford. But the utility was unable to win zoning approval for the plant which adjoins residential areas. Connecticut L&P then turned to Manresa Island, Norwalk, as a site for the plant and has received zoning commission approval for the project. Several Norwalk groups, however, are appealing the commission's action to the Supreme Court.

Stamford offered to buy the Cove Mills property from the utility for $400,000 in 1951 but no agreement was reached. In contesting the condemnation action, Connecticut L&P argued that the property was not needed for municipal purposes, that Stamford had failed to attempt to agree with the company on a purchase price before voting to condemn the land, and that Connecticut L&P had appropriated the land for a public use, i.e., construction of a power plant. The judge overruled all three claims.

Utility Seeks Permit

• Grant Lake Electric Power Co, Inc, Anchorage, Alaska, has applied to the Federal Power Commmission for a preliminary permit for a proposed hydroelectric project on Grant Creek and Grant Lake, Kenai Peninsula, Alaska. Powerhouse would have an initial capacity of 2,000 hp, with provisions for adding another 2,000 hp.

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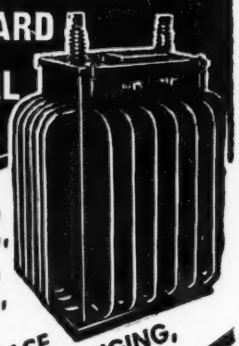

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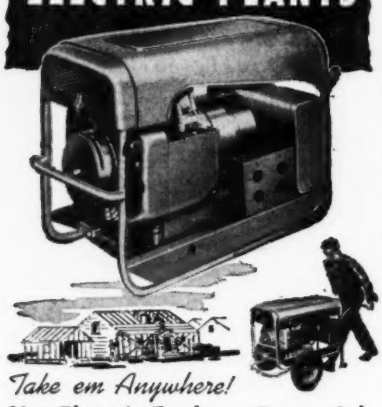

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Bond Sales at Record

(*Continued from page* 98)

New preferred "new money" issues sold publicly totaled $71.8 million during the second quarter of 1953 and $142.5 million in the first half of this year. The average yield based on price paid by the public was 4.99% on the nine issues sold in the second quarter of 1953 and 4.52% on nine issues sold during the first quarter.

Common stock sales totaled $329 million in the first half of 1953 a little short of the $329.6 million sold in the same period of last year. It is estimated that around 70% of the common stock needed to finance the $3 billion construction program in 1953 has been sold in the first half.

Net Income Up, Stock Prices Down . . . Despite a continuation of the upward trend in net income available for common stock running around 15% ahead of 1952, electric company common stock prices followed a downward trend. Yields on all quality common stocks rose sharply as shown in the chart of Reis & Chandler. Some 30 electric companies increased their dividends during the first half of 1953 as compared with only 17 in the same period of 1952. Earnings per share are also rising but at a much lower rate because of the continued substantial issuance of common stock.

FINANCIAL BRIEFS

Pennsylvania Power & Light Co stockholders will vote at a special meeting on Oct. 1 to approve the merger of Scranton Electric Co into PP&L, to increase the number of directors, and to reduce capital stock to eliminate surplus shares not issued in exchange for Scranton Electric stock or not needed to complete the merger.

British Columbia Power Corp's shareholders will vote Aug. 21 on a proposal to convert 1,240,000 Class A shares into 2,480,000 common shares and one million Class B shares into 500,000 common shares . . . **Wisconsin Power & Light Co** has asked SEC approval to buy all 16,174 outstanding shares of Interstate Power Co of Wisconsin from Interstate Power Co of Iowa for a base price of $2.359,-730.

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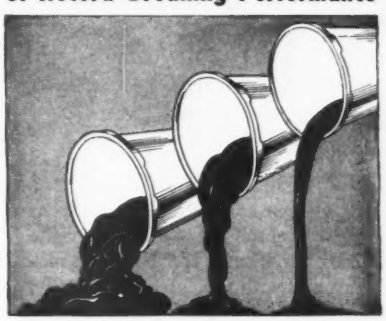

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"There was no time to stop, see? She comes running out from behind this parked car right under my wheels. Her hair is in pigtails, and with the sun shining on it, she might have been *my* kid. We got her to the hospital. It took 3 pints of blood to bring her around. All I have to do is remember the sound of those screaming tires—and I know why *I'm* giving blood."

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- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed your employees of your company's plan of co-operation?
- ☐ Was this information given through Plant Bulletin or House Magazine?
- ☐ Have you conducted a Donor Pledge Campaign in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

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NATIONAL BLOOD PROGRAM

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3— 333 KVA Mol 7200/12470Y-2400/4160Y
3— 250 KVA G-E 6600-575
3— 150 KVA G-E 19050/33000Y-2540/4000Y
2— 150 KVA G-E 6900-230/460
3— 100 KVA G-E 33000-6900/11950Y
3— 100 KVA G-E 4000-115/230
3— 50 KVA A-Ch 33000-6900/11950Y
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1	1000	Moore	Condensing—Extraction—190 lbs., 2400-3-60—Surface Cond.
1	750	G.E.	Condensing—265 lbs., 440-3-60 Built 1944
1	500	Moore	Non-Cond—150/200 lbs., 5/35 lbs. B.P., 480-3-60 Dir. Conn. Exciter
1	400	Westgh.	Non-Cond—125/150 lbs., 5/10 lbs. B.P., 240/480-3-60
1	300	G.E.	Non-Cond—150/175 lbs., 5/10 lbs. B.P., 480-3-60

FREQUENCY CHANGERS

Qu	Kva	Make	Cycles	Voltages
1	12500	Whse.	25/60	13200 x 13200
1	3750	G.E.	25/60	4150/2400 x 2400/4150
1	3125	G.E.	25/60	4150/2400 x 2400/4150
2	2500	G.E.	25/62½	2300 x 4160
1	1250	G.E.	25/58.3	4400 x 2300
1	625	A.C.	25/60	11000 x 2300

MOTOR GENERATOR SETS

3 ph, 60 cy.

Qu	KW	Make	Speed	DC Volts	AC Volts
1	3000(3U)	G.E.	514	600	4000/13200
2	2000	G.E.	450	250	2400
2	2000	G.E.	514	600	6600/13200
1	2000	G.E.	500	666 25 cy.	11000
2	1750	G.E.	514	250	2400
1	1500	C.W.	514	115	4000/13800
1	1500	G.E.	720	600	13200
3	1500	G.E.	514	250	6600/13200
1	1500	G.E.	600	600	2300/4150
1	1000	G.E.	900	260	4100/6900
2	1000	Whse.	900	600	2300/4150
1	750	Whse.	900	275	2300/4150
1	500	Whse.	1200	125/250	2300
1	500	Whse.	900	250	440
1	500	G.E.	720	125	2300

TRANSFORMERS—60 Cycle

Qu	KVA	Make	Type	Ph	Voltages
1	5000	Whse.	OISC	3	33000x26400/13200
1	2500	Whse.	OISC	3	26400/13200 x 480
3	1250	G.E.	HVDDJ		6600x550
1	1150	A.C.	OISC		3200x480/2400
3	1000	G.E.	HVDDJ	1	2200/480

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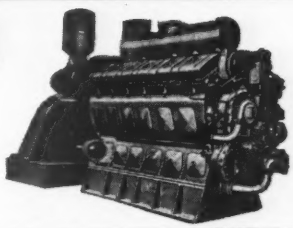

A PARTIAL LISTING OF OUR INVENTORY

KW	Make	Model	HP	RPM	KW	Make	Model	HP	RPM
1980	Nordberg	TS-217	2800	225	320	Enterprise	DSG-6	560	450
1136	Fairbanks Morse	38D	1600	720	300	General Motors	8-268A	450	1200
1100	General Motors	16-278A	1600	720	200	General Motors	8-268A	350	900
750	General Motors	12-567	1080	720	150	Worthington	CC-4	225	450
500	Baldwin	VO-S	750	514	150	Ingersoll-Rand	S-4	225	600
500	General Motors	8-278A	750	720	150	Buckeye	80	240	600
500	General Motors	8-567	720	720	100	Worthington	BB-5	150	600
480	Worthington	DD-8	700	360	100	General Motors	3-268A	150	1200
400	Ingersoll-Rand	S-8	600	720	60	General Motors	6-71	90	1200
350	Baldwin	VO-6	510	450	30	Internat'l Harvester	UD-14	45	1200

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1000	West. (3-u.)	11000	137/275
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450	G. E. (3-u.)	2300	125/250
400	A. C.	2300	120/240
300	Cr-Wh	440	250
200	G. E.	440	550
200	West.	2300	275
200	G. E.	440	600
150	G. E.	2300/440	250
150	G. E.	2300/4000	125/250
150	G. E.	440	275
125	G. E.	440	300
125	West.	440	250
100	G. E. (25 cy)	440	125
100	G. E.	2300	250
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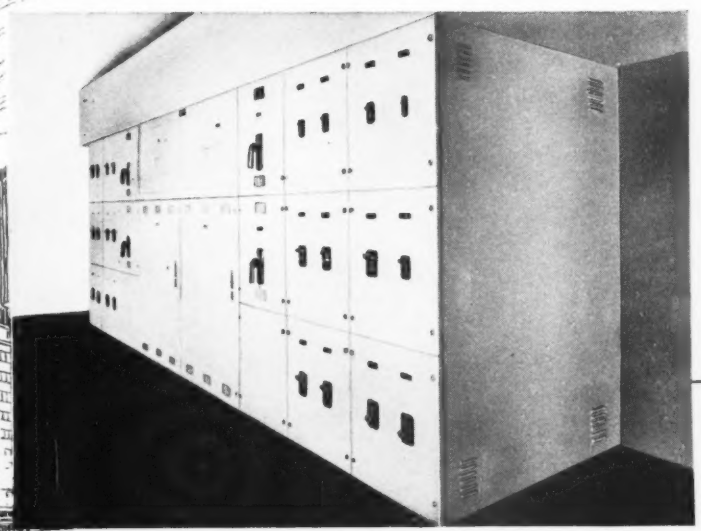

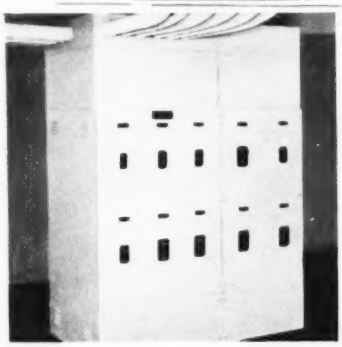

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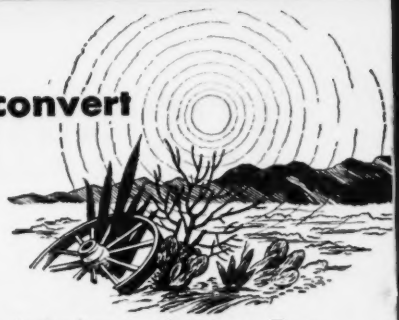

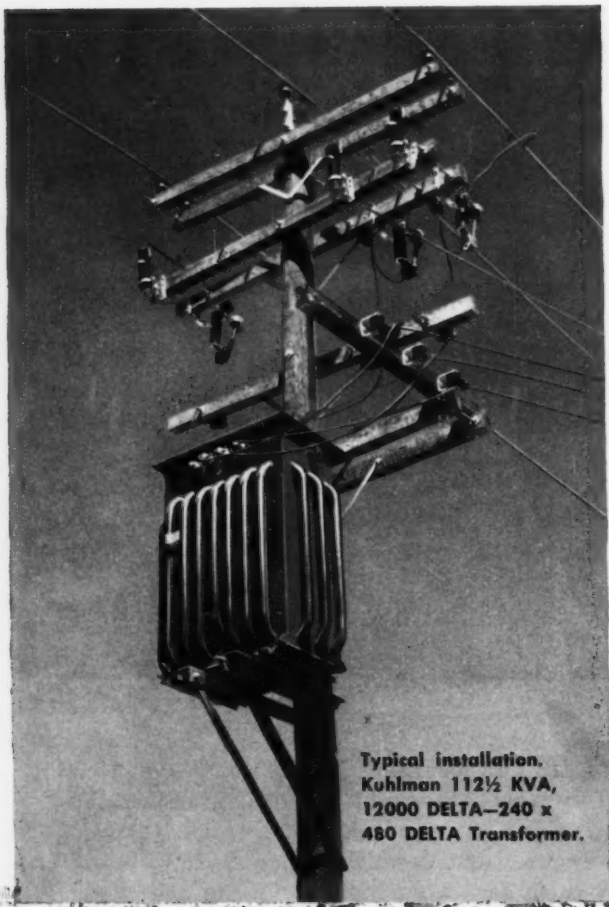

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